Rock Products

and CEMENT and ENGINEERING NEWS (Est. 1896)

THE OLDEST PUBLICATION IN ITS FIELD AND THE RECOGNIZED AUTHORITY

New Williams-equipped Fine Grinding TALC PLANT

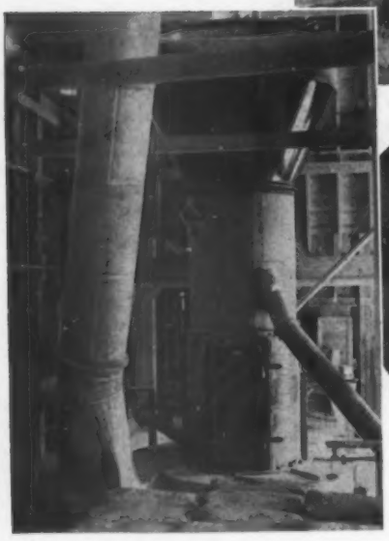
Southern Talc Company plant with raw talc storage building shown at the left.

Advantages that go with WILLIAMS Roller Mills:

(1) Ball Bearing Operation Throughout

(2) Steel, not cast iron, Castings at important points

(3) Instantly Changeable from 70% minus 100-mesh to 99.99% minus 325-mesh.



Williams 4-roll Roller Mill with Air Separator. For grinding to 99% through 325-mesh.

Looking down on Williams Hammer Mill which reduces raw talc to ½" minus size.

Williams 4 x 10 ft. double-deck Vibrating Screen. For production of roofing granules.

THE newly completed plant of the Southern Talc Company at Chatsworth, Georgia, typifies the best modern practice in processing ground talc, and the equipment represents the maximum of efficiency in reduction methods.

The plant is extremely flexible to permit making any commercial grade in demand. Extreme accuracy is also an outstanding feature. Williams supplied all of the major equipment including a Hammer Type Primary Crusher to break the mine run talc for the fine grinder, a Roller Mill with Air Separator which grinds as fine as 99% 325 mesh and a Vibrating Screen for making roofing granules.

If you have a reduction problem either coarse crushing, fine grinding or a complete plant, let Williams engineers tell you about the proper equipment for the job.

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37 West Van Buren St.

New York
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San Francisco
326 Rialto Bldg.

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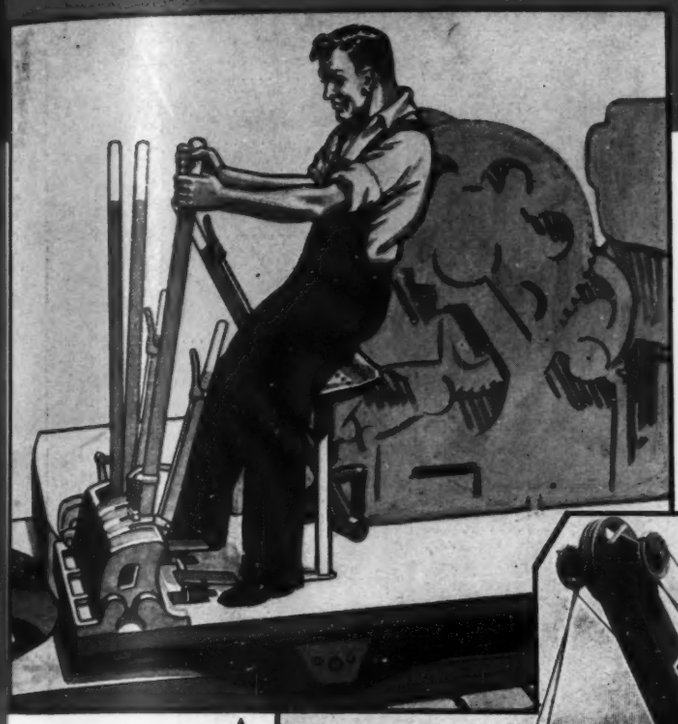
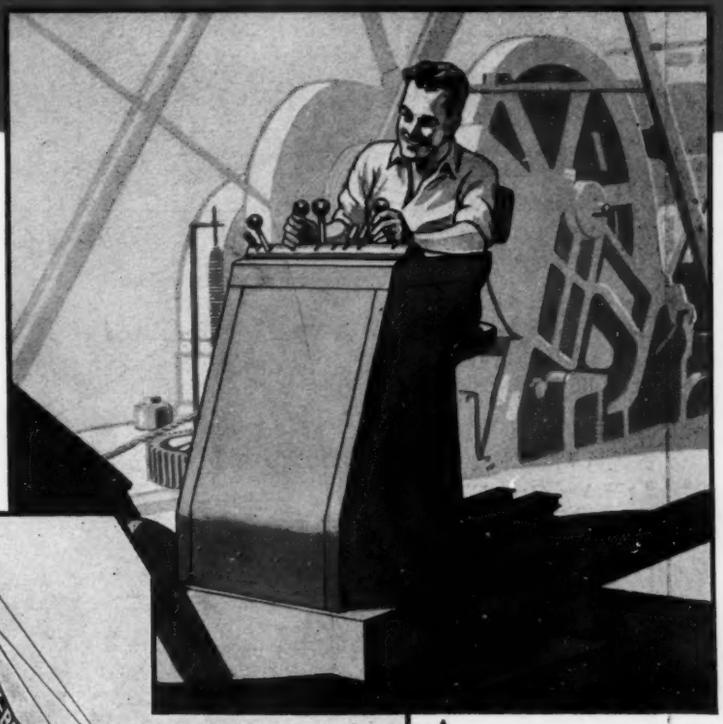
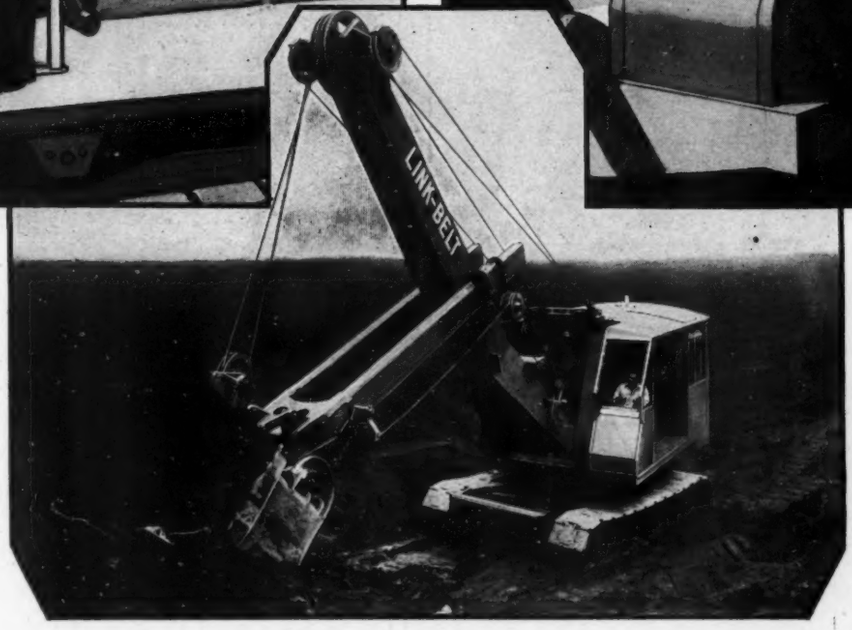
PATENT CRUSHERS GRINDERS SHREDDERS

Speed-o-Matic

GIVES EFFORTLESS CONTROL







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Entered as second-class matter, Jan. 30, 1936, at the Chicago, Ill., postoffice, under the Act of March 3, 1879.

(Published Monthly)

September, 1936

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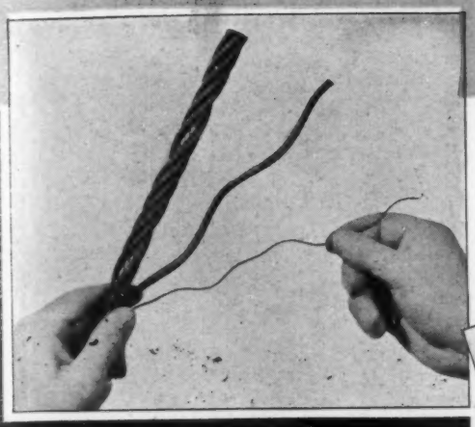
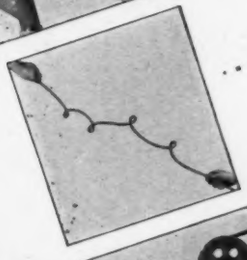
why MONARCH WHYTE STRAND PREformed wire rope

gives satisfactory service on tough excavating jobs

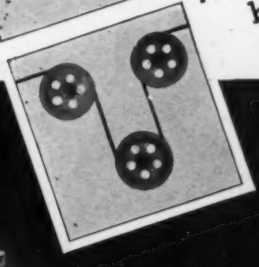


Macwhyte's special PREforming pre-shapes every wire . . . every strand to the exact shape it takes in the finished rope . . .

. . . increases flexibility
. . . decreases internal stress

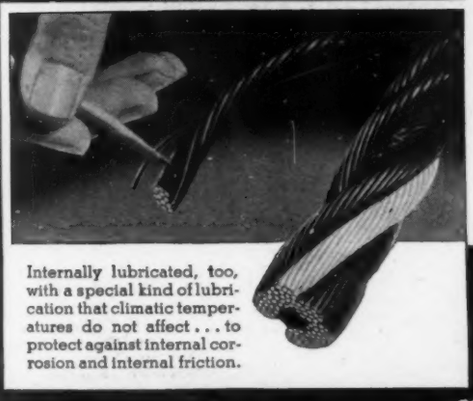


. . . resists kinking when rope is not under load



. . . reduces fatigue caused by continuous high-speed bending

(247)



Internally lubricated, too, with a special kind of lubrication that climatic temperatures do not affect . . . to protect against internal corrosion and internal friction.

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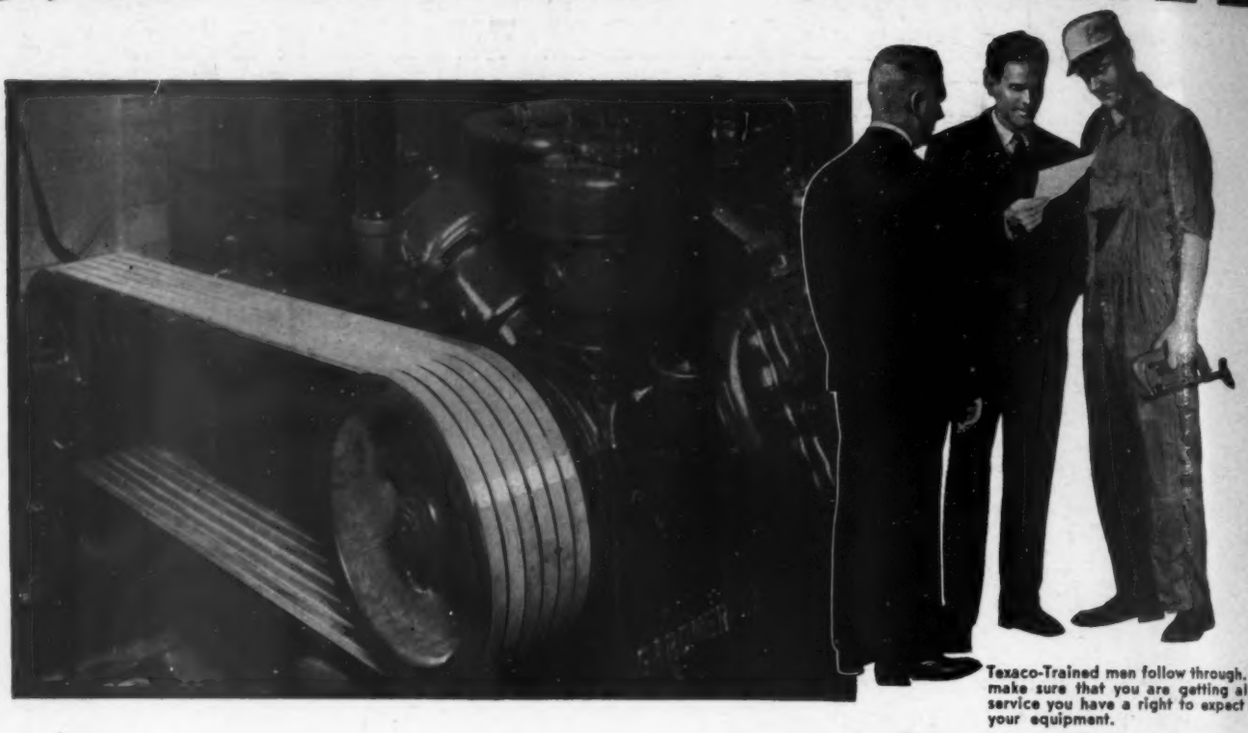

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Full details in Bulletin No. 116.

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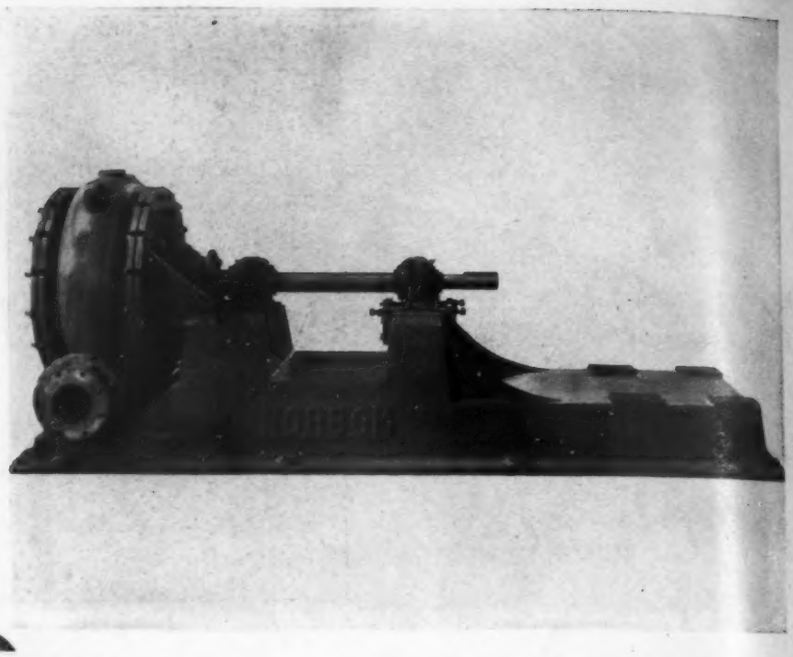

ON DREDGE PUMPS

SKF *Bearings keep rotating parts working smoothly*

Two Norbom dredge pumps, equipped with SKF Bearings and Pillow Blocks, have been in service since August 15, 1935. The sand pump, driven by a 125 H.P. motor at speeds up to 1170 R.P.M., conveys material through 650 feet of 6-inch pipe to an elevation of 30 feet. The booster pump, driven by a 75 H.P. motor at a constant speed of 870 R.P.M., pumps through 625 feet of 6-inch pipe to a screening plant at 25 feet elevation. And they haven't stopped yet for bearing trouble.

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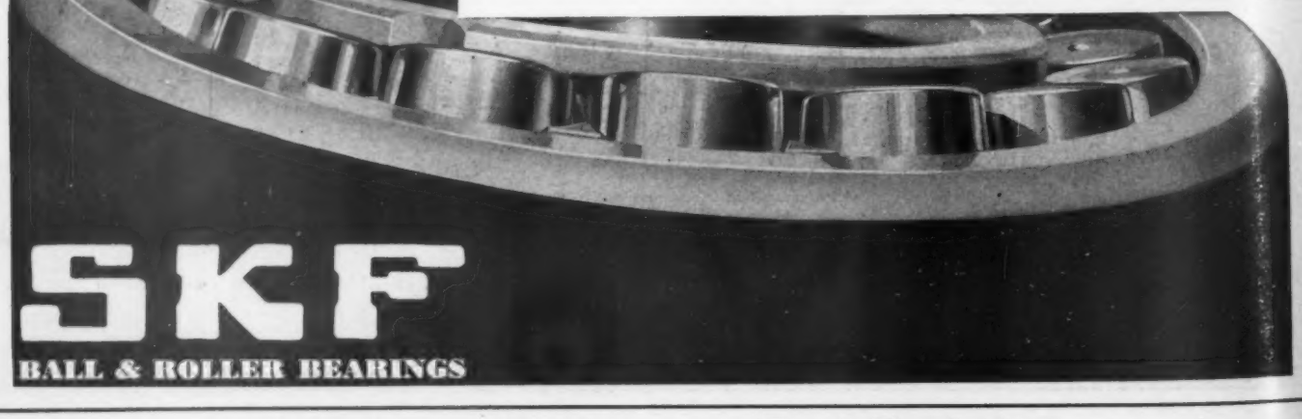
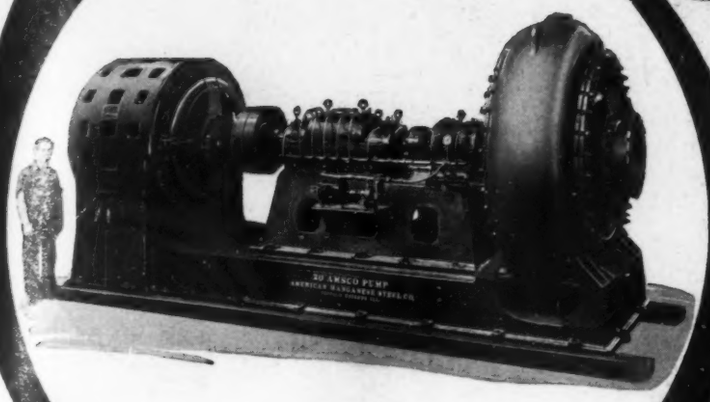
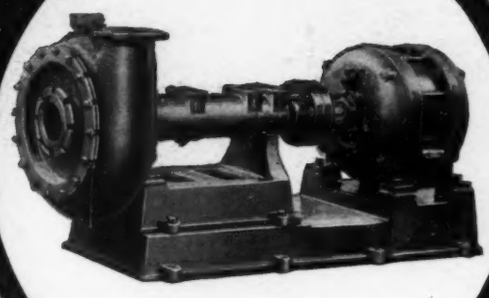


SKF
BALL & ROLLER BEARINGS

From 3" to 20"





AMSCO Manganese Steel Materials Handling Pumps!

No matter what your materials pumping problem may be — there's an AMSCO Pump in type and model just suited to your needs.

AMSCO Manganese Steel Pumps are made in all sizes from 3" to 20" for pumping materials of all kinds.

An interesting comparison of capacities, dimensions, etc., of the two AMSCO Manganese Steel Pumps illustrated follow: Small Pump, size 3", nominal capacity 230 g.p.m., solids capacity 7 to 10 yards per hour; height 2'3", length 4', weight with motor 1 ton. Large Pump, size 20", nominal capacity 12,000 g.p.m., solids capacity 360 to 520 yards per hour, height 8'6", length 19'6", weight with motor 40 tons.

AMSCO Pumps feature durability of construction, lasting efficiency, accessibility of all parts, and a much longer service life because all water-end parts are made of manganese steel, the toughest, abrasion-resistant steel known! They are widely used for pumping sand and gravel, and wasting sand in commercial aggregate plants.

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May we furnish you with operating details on AMSCO Materials Handling Pumps?

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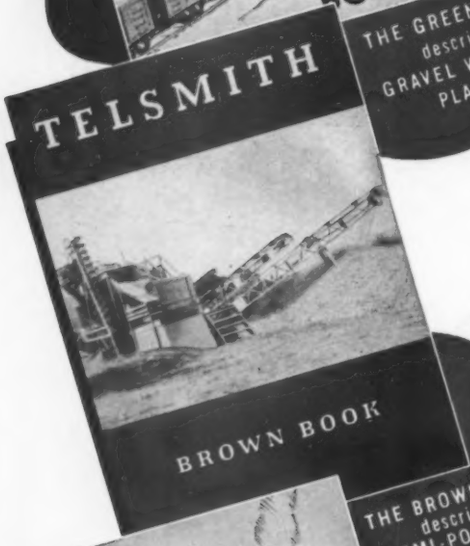

THE BROWN BOOK describes SEMI-PORTABLE QUARRY and GRAVEL PLANTS

THE BLUE BOOK describes QUARRY PLANTS

What's new in plant layout? What has been the influence of today's conditions, competition, and markets? What changes have new and improved equipment brought about in layout and production . . . in gravel washing plants . . . in quarry plants? Where do semi-portable plants fit into the present picture?

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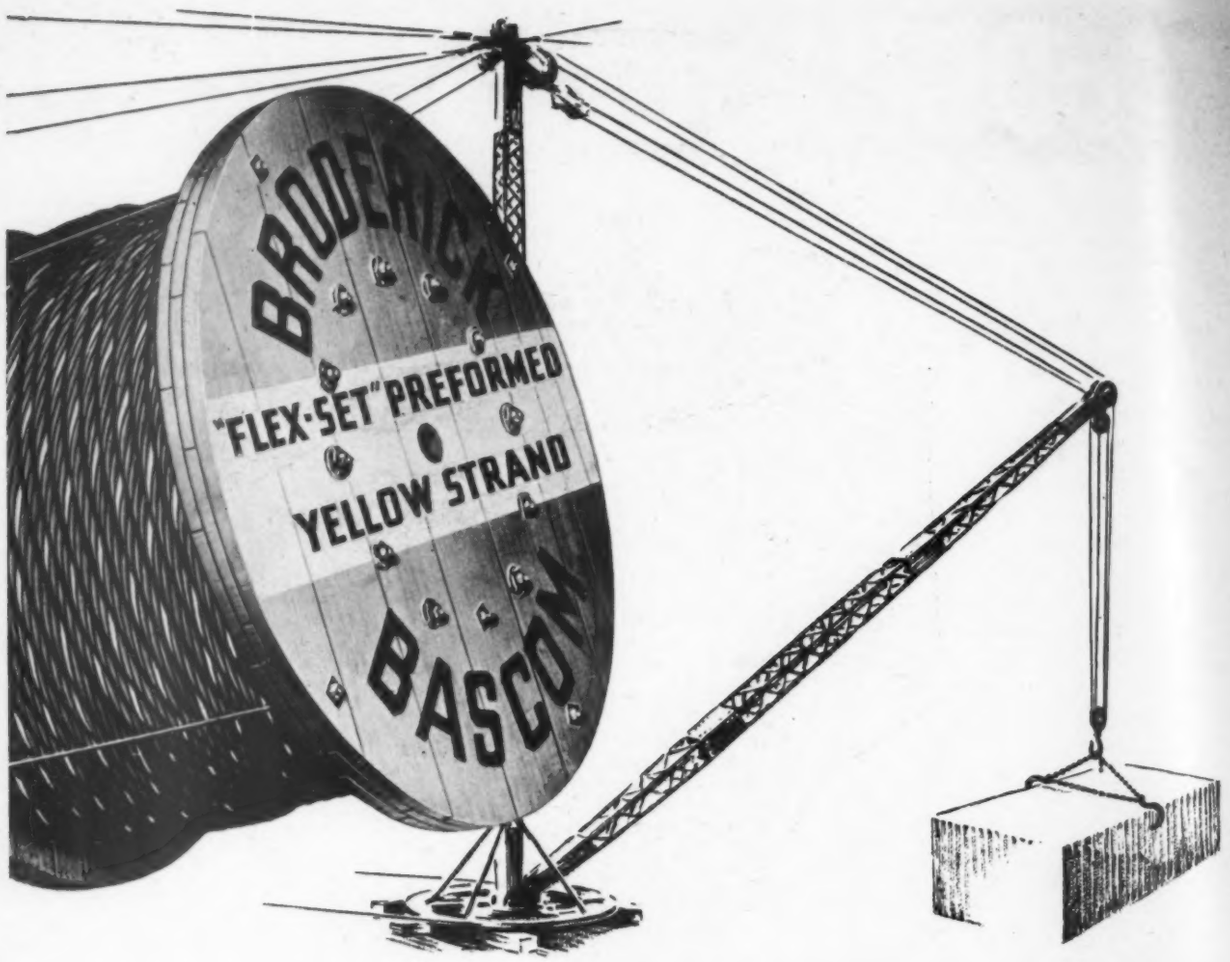

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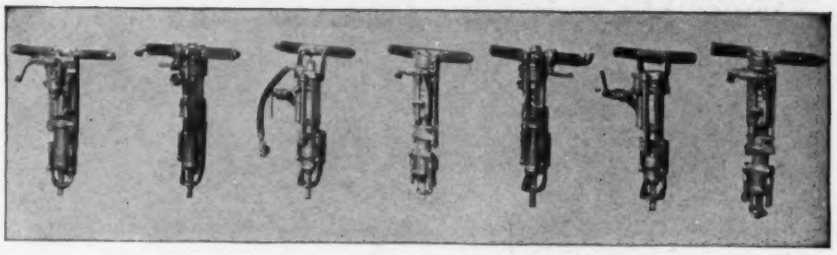
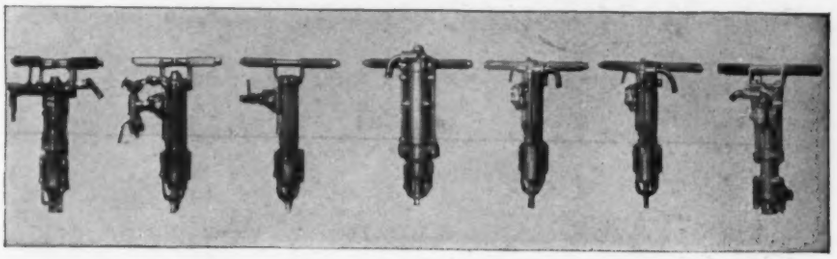
Cleveland Drills of each type and size are fast cutters, easy to handle, smooth in operation, and—they habitually use less air. Whether your job is primary or secondary drilling—or both—there's always a Cleveland that will save you money on drilling costs.

The Cleveland Line is complete. There are 14 sizes and types of hand hammer drills—5 sizes of drifters, or tripod drills, and the WD and DR Types of drill rigs—all suitable to one kind or another of quarry operation.

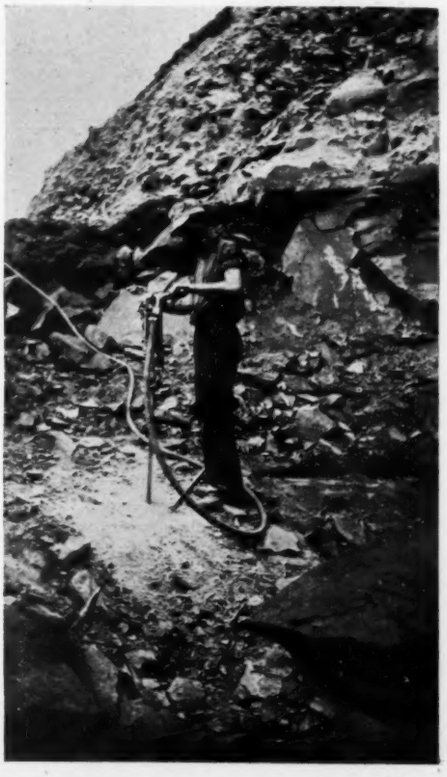
Give us a tough drilling job—we'll show you how the right Cleveland Drill will save you money. Our new catalog is for the asking. Did you get a copy of the revised Handbook? Yours is here for you—just fill in the coupon and mail.





At Right—One of 27 Cleveland Drills on a big road job in Ohio.

Bulletins 109 and 111 give all the information on Savings with Cleveland Drill Rigs.



THE CLEVELAND ROCK DRILL CO.
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THE CLEVELAND ROCK DRILL COMPANY
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Gentlemen:—Please send me the "Driller's Handbook."

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Clay Diggers.....

Back Fill Tampers.....

Wagon Drills.....

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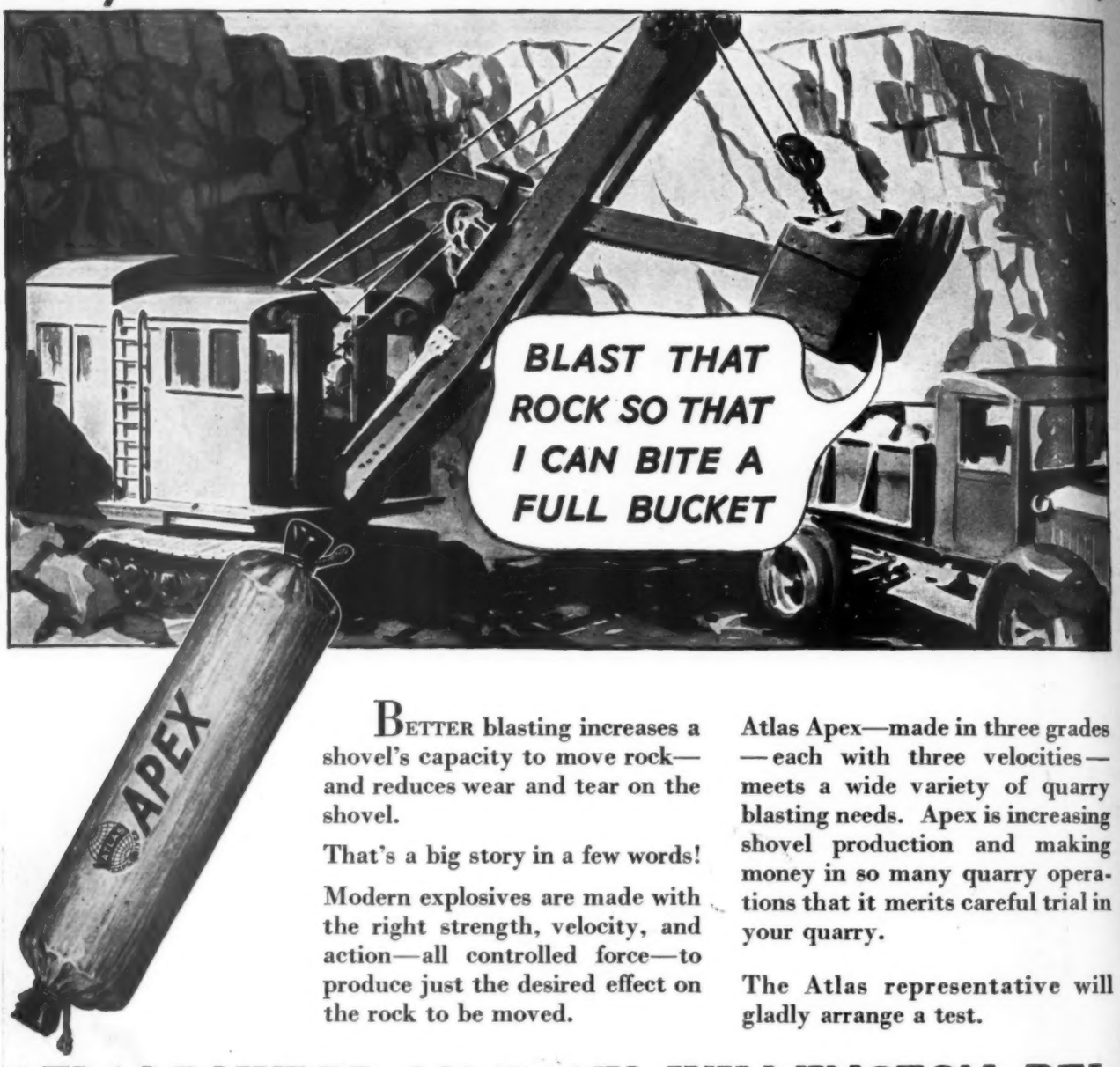

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Modern explosives are made with the right strength, velocity, and action—all controlled force—to produce just the desired effect on the rock to be moved.

Atlas Apex—made in three grades—each with three velocities—meets a wide variety of quarry blasting needs. Apex is increasing shovel production and making money in so many quarry operations that it merits careful trial in your quarry.

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Cable Address—Atpowco

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WHEN YOU TALK to the Socony-Vacuum Representative you get facts that can be substantiated to the last dot by definite proof.

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• • •

Socony-Vacuum Representatives cooperate with your men; those who know your own problems best. This often leads to improved work and worth-while operating economies.

SOCONY-VACUUM OIL CO., INC.

INTERESTING EXAMPLE NEXT PAGE

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● An Eastern contractor turned to Gargoyle D.T.E. Oils for his 3-ton excavator. He soon found an annual saving in his oil bill of $456. Extension of renewal period for the oil made an additional saving of $25 a year.

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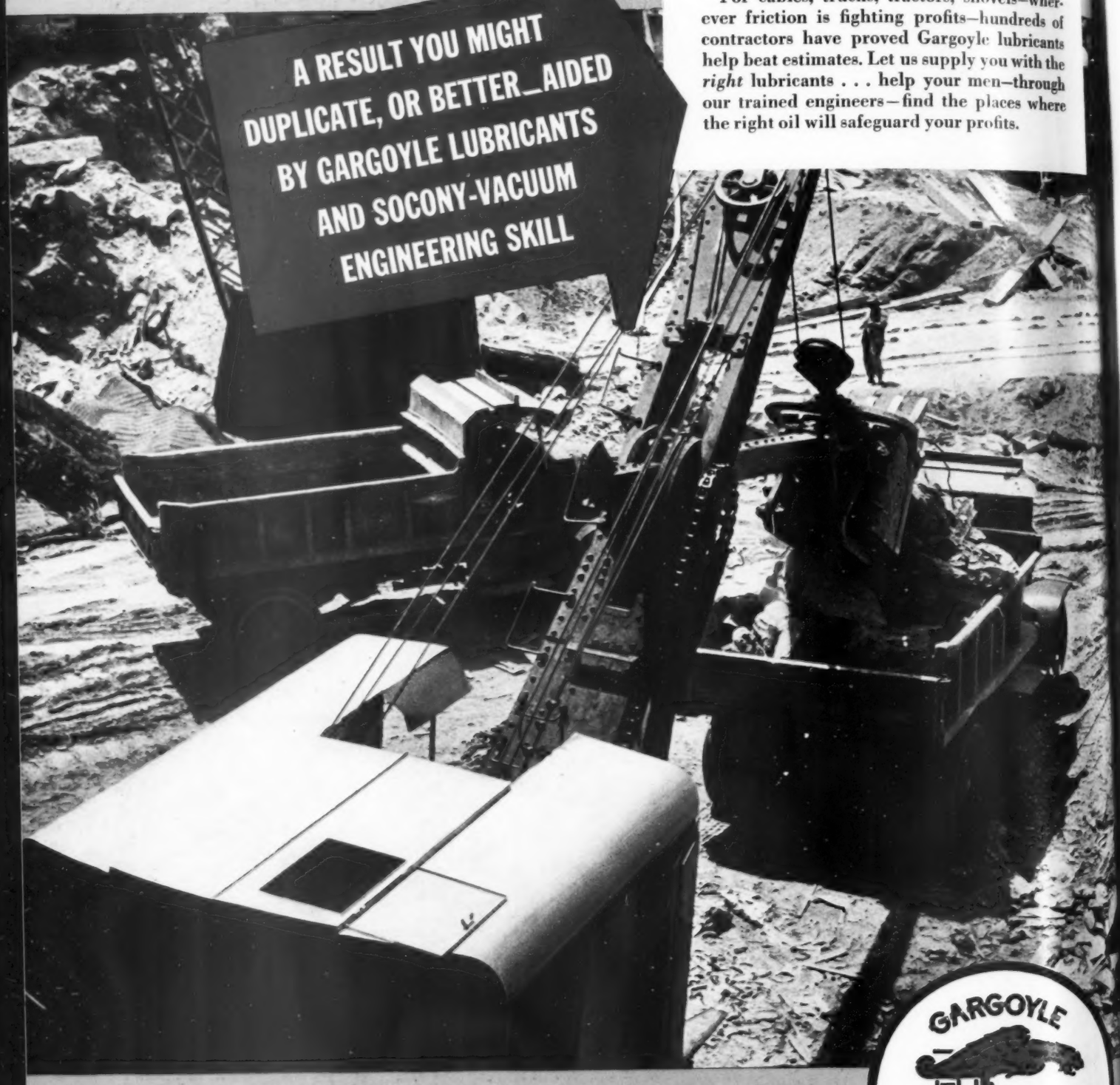
For cables, trucks, tractors, shovels—wherever friction is fighting profits—hundreds of contractors have proved Gargoyle lubricants help beat estimates. Let us supply you with the *right* lubricants . . . help your men—through our trained engineers—find the places where the right oil will safeguard your profits.



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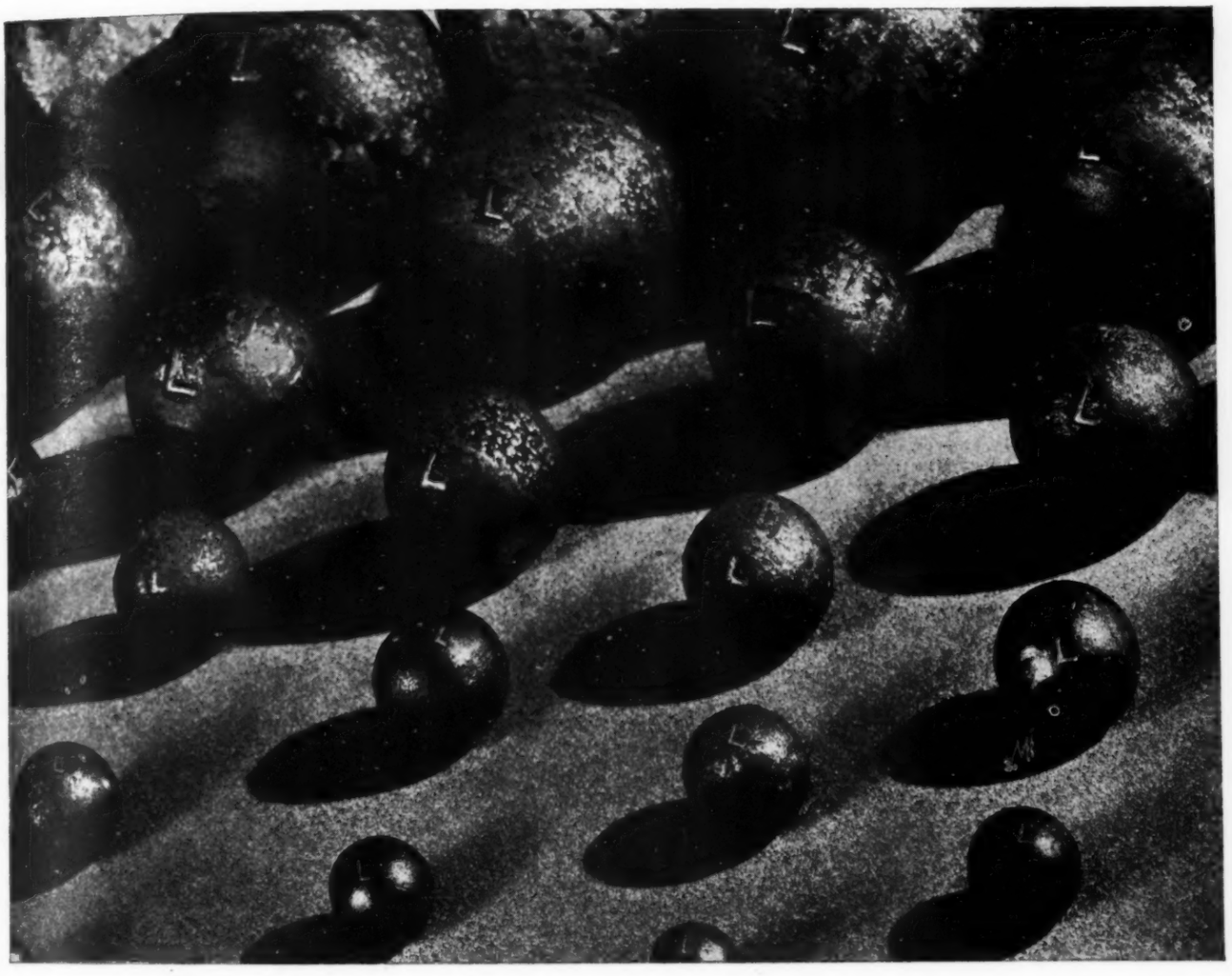

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Uniformity, therefore, is assured in Lorain Grinding Balls. You get correct structural characteristics and proper physical properties in the metal because of scientific metallurgical control. You get proper finishing and heat treatment because of control at those stages.

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The NEW model GAYCO Separators insure a more uniform product, greater capacity, cleaner tailings and higher efficiency than is possible with any other Air Separator. Quick Positive Adjustment can be made for any mesh product desired from as coarse as 60 mesh to as fine as 100 per cent through 400 mesh on some materials.

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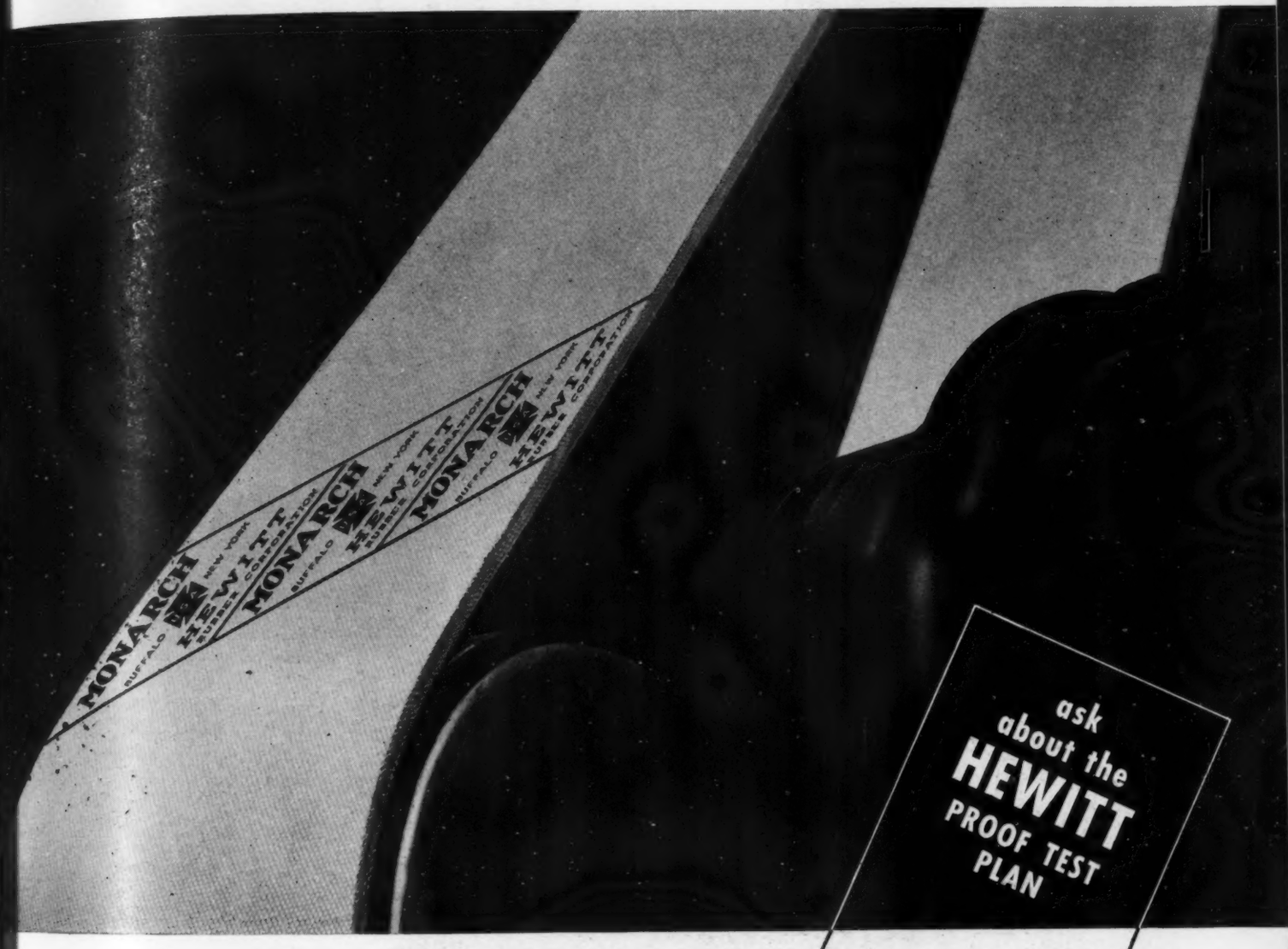

In every industry, without exception, there are production managers, plant operators and purchasing agents who insist there is no boundary to the superfine performance of HEWITT transmission belts. Year in and year out they stick to HEWITT and always get a larger measure of service than even they expect. Any one of them will tell you "It's safer to specify HEWITT". Whatever your requirements may be, whatever is the service to which your belting is put, there is a brand of HEWITT made especially for the job. The HEWITT distributor will describe an imposing array of features —talk it over with him. You will find him listed in the classified telephone directories of major industrial centers under "Rubber Goods" or "Belting". HEWITT distributors also have a new idea in purchasing industrial rubber goods—the HEWITT Proof Test Plan.

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3/8 and 1/2 yard machines that can "TAKE IT"

HERE is the rotating base of Northwest 3/8 and 1/2 yd. shovels, cranes and draglines. Compare it with the welded bases of other machines of equal capacity. It is a solid one piece casting free from structurals—sturdy, rigid, rugged — more than capable of taking the shocks of digging that it will receive.

And this is typical of the entire construction of Northwest Models 15 and 18. They are heavy duty throughout, and include features for output found on no other line, size for size.

There is a new bulletin describing these machines in detail. Free on request.

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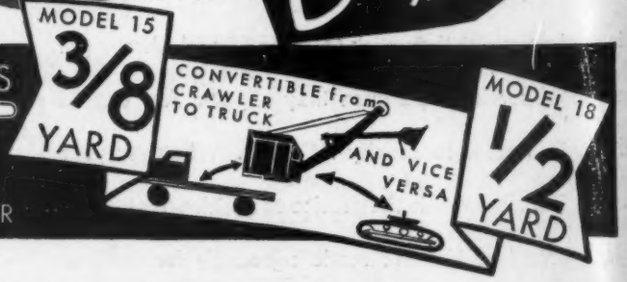

"MONEY MAKES THE MARE GO"

BUT RUBBER BRINGS HER BACK

A typical example of Goodrich product development

THE horse is staging a comeback, and *rubber* is one of the chief factors making that comeback possible.

Along congested milk and bakery routes, it is found that time is saved because the horse starts and stops without attention or time from the driver. The horse even stops at the right houses of customers, if a new driver forgets some of the addresses!

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Goodrich

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Note the sleek, smooth lines of the Timken Bit and steel—not a break in the contour —no projection or overhang where bit and steel meet.

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The shoulder on the steel (see sectional illustration) is the feature that makes possible Timken streamlining—and the practical advantages that go with it.

It speeds up drilling by permitting the hammer blows to be transmitted directly to the body of the bit thereby protecting the threads, and making possible an even distribution of the driving force. The steel does not bottom in the bit, and therefore the threads are not subject to injury from hammer impact.

Another advantage of Timken Streamlined Bits is easy withdrawal from the hole after drilling. There is no obstruction for chips to lodge behind and wedge the steel in the hole. This feature is a great time and temper saver.

The benefits of streamlining are obtainable only with Timken Bits. It will pay you to use them. Write for complete information.

Complete Stocks Maintained in Principal Distributing Centers

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Some Stand Bending Longer—

Select the Rope that Fits Your Job

Continued bending and unbending of wire rope over housing drums and sheaves eventually causes breaking of the crown wires from fatigue. When bending is the primary destructive force in a particular wire rope service, a design should be selected that has the strands made up of a large number of small wires rather than a few heavy wires. When other destructive forces prevent the selection of an ideal design to withstand bending, larger sheaves should be used to render the bending less acute. We will gladly advise you of the design that will give the longest rope life in your service and also furnish tables of sheave-rope-ratios. Write today.

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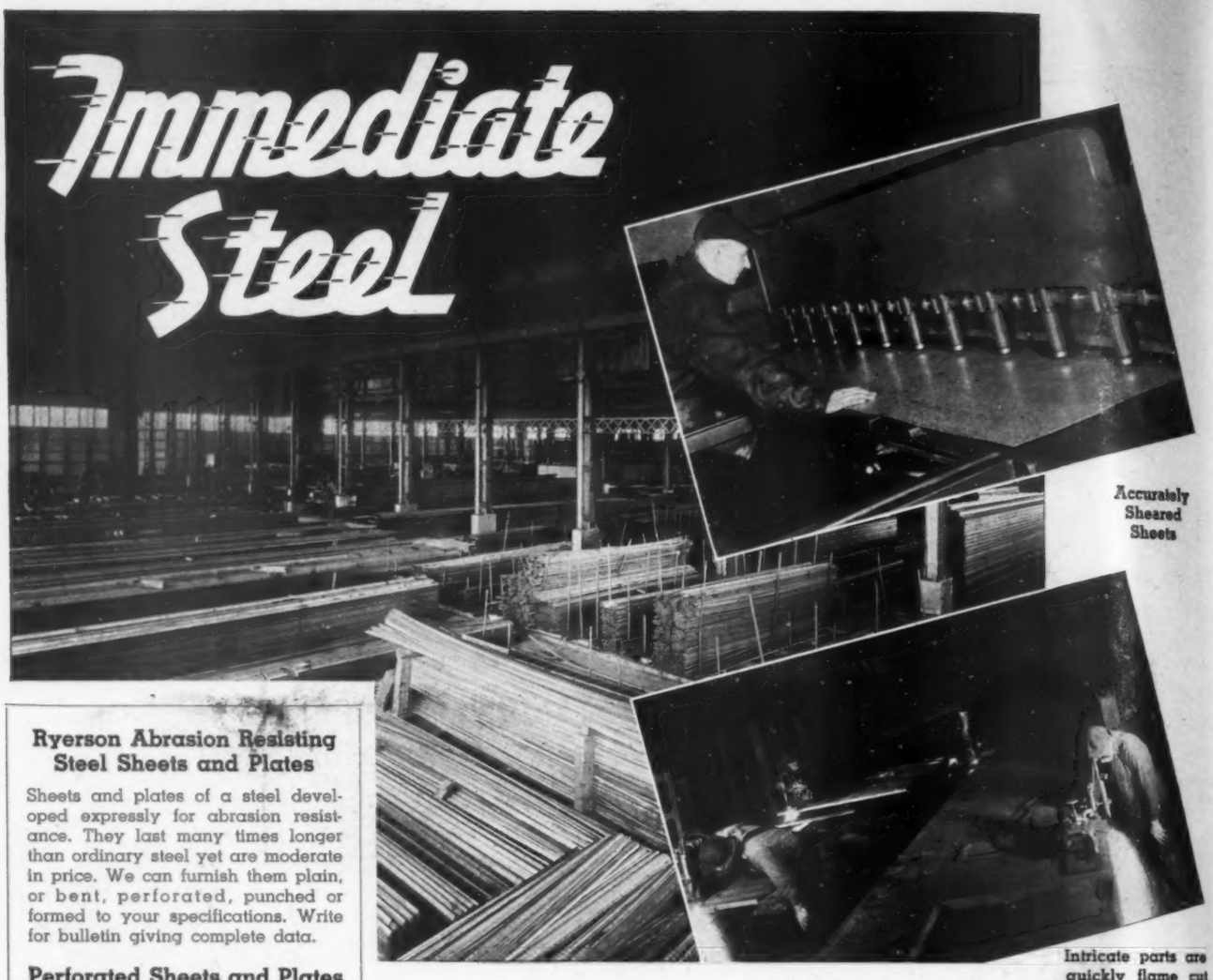

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Sheets and plates of a steel developed expressly for abrasion resistance. They last many times longer than ordinary steel yet are moderate in price. We can furnish them plain, or bent, perforated, punched or formed to your specifications. Write for bulletin giving complete data.

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WHEN something breaks or when construction or extensions are necessary, you can depend on immediate shipment of the steel from a nearby Ryerson plant. More than 10,000 sizes and kinds of steel and allied products are carried in stock. If you desire it, experienced workers will quickly cut, bend, punch or form the material to your specifications.

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RYERSON

Rock Products
With which is Incorporated CEMENT and ENGINEERING NEWS Founded 1896

Volume XXXIX Chicago, September, 1936 No. 9

Horizontal, Vertical, or No Union?

THE PRESIDENT of a rock products company whose plant has recently won a trophy in a national safety competition tells us that from now on he is going to pay much more attention to employe relations—and public relations. Perhaps for the first time he has met his employes when they were not working at their jobs—when they were celebrating with him a mutual achievement. Perhaps, for the first time both he and they have felt that they were, at least for the moment, on somewhere near a common footing.

That experience is one of the fortunate byproducts of safety compaigns. It emphasizes that success in industry is teamwork. The employes see their employer in a new light; probably, they come to the conclusion he is not such a bad guy after all—that he is as human as they are. And he perhaps concludes, equally felicitously, that they are as human as he is.

If both are sincere, the relations thus established can be maintained, and there is little chance for controversy. In industries such as these, with relatively small, isolated operations, the problem of healthful employe relations is frequently solved as easily as that.

Public relations, if they rest on a firm foundation, spring from employe relations. Of all the great corporations, probably the Ford Motor Co. enjoys, and has continuously enjoyed, a maximum amount of public goodwill. The basis of this is undoubtedly the popular conception that Mr. Ford has always treated his employes better than does the average employer. And he does it in a business-like way, without the semblance of paternalism, at least so the public believes.

Today we are probably facing a more critical national labor problem than many employers recognize. It arises largely from NRA experience, when the various industries established, with the sanction of the federal government, what were presumed to be code laws covering maximum hours of work and minimum wages. The government thus undertook to do, with the coöperation of industry, what the American Federation of Labor had tried unsuccessfully to do. Whatever else the NRA may or may not have accomplished it did bring about more intimate relations between employes and their employers, and caused a great increase in company unions.

At that time the employer could well say to his employes that they gained nothing tangible by being members of a national labor union, because the industries and the government had entered a pact, and established the machinery of enforcement, to see that the employes got a "break." Those employers who had every desire to pay fair wages and treat their employes decently had the power, presumably, to compel their reluctant competitors to do likewise.

The NRA codes lacked flexibility in that they did not provide adequately for seasonal employment. In many instances the employes themselves were dissatisfied because of short working weeks during the only periods when there was any work to be done. But these difficulties could have been ironed out in time.

The closer relations established with employes during this period were undoubtedly a threat to the American Federation of Labor. For with experience under the NRA codes employes would sooner or later

Announcement

ROCK PRODUCTS' address is now 205 West Wacker Drive, Chicago, Ill. This is the well-known Engineering Building, where the offices of numerous material concerns are located, as well as the Western Society of Engineers.

Our many friends and visitors, both in this country and abroad, are cordially invited to look in on us when they are in Chicago. Our new telephone number is CENtral 0670.

New York Change

ROCK PRODUCTS' address in New York City is now 56 West 45th St.; telephone, Murray Hill 2-3006.

Introducing a New Manager

Effective September 1, ROCK PRODUCTS has a new General Manager—George C. Williams, who has an enviable record for successful accomplishments in publishing, based on his deeprooted conviction that service to the reader is of paramount consideration, that a publication should not only be a forum for discussion and for dissemination of news, but should, so far as it lies in its power, point the way of progress. A portrait and biographical sketch will be found on page 31.

have been much better informed as to the problems and difficulties of their employers in meeting payrolls, and there would have been more teamwork in solving these problems and difficulties, which were beginning to be visualized as mutual.

Now comes along a capable organizer who undoubtedly saw and analyzed this trend, who saw a chance to capitalize on it, by changing labor organization setups into so-called vertical unions—local union chapters that would place in one group, or one union, all the employes of an industrial plant, without regard to their kind of craftsmanship. It was the logical way to capitalize, for labor organizers, the trend and progress under NRA.

Courtesy of Chicago Journal of Commerce

So there is a bitter struggle between labor organizers, the American Federation of Labor, headed by a man who seems chiefly concerned in keeping his well-paid job, and the rebel Committee for Industrial Organization, headed by a very aggressive, colorful individual who is well known to have aspirations to the Presidency of the United States. The crux of the struggle at present is the steel industry, where company unions are the rule, but in the list of industries to be "organized" shortly by the C. I. O. is the rock products group.

The steel industry, as a unit, has taken a decided stand and will, so it says, resist the C. I. O. to the last ditch. The steel companies object to it chiefly because their own company unions are functioning satisfactorily, because they resent "outsiders" telling their own employes' leaders what to do, to establishment of closed shops, to the check-off system for payment of union dues, to its political character.

While several rock products companies have company unions, in general, of course, the employes of the industry are not organized. Therefore, perhaps, employers are open-minded. There has been little opposition to the establishment of C. I. O. vertical unions at numerous plants, particularly in the East and Central West. Some employers think it preferable to the American Federation of Labor horizontal type of union, with its interminable conflicts of jurisdiction.

We must face the fact that all over the world a struggle is going on between the so-called upper and lower crusts of society. We have plenty of evidence of its backwash in many of the acts and policies of the present administration at Washington. Whether this administration is fostering and leading this struggle in this country, or is merely irresistibly pushed out in front by the movement itself, we of this generation will probably never be able to tell.

We, fortunately, are not yet called upon to choose between fascism and communism. We probably will have to choose between enforcement of codes of working hours and minimum rates of wage by labor organizations or enforcement by the government. Rather than industry being further handicapped by federal legislation, the former is preferable.

Labor organizations can be constructive. If the code regulations were good for industry, as many employers believed at the time, they can be enforced by labor better than by government. In fact the government could not enforce them, and that is one reason the codes broke down long before the court's decision.

Acme Photo

Wm. Green, Madam Secretary of Labor Perkins and John L. Lewis

The present administration is trying to restore the substance of the former NRA codes. The Walsh-Healey act restoring code labor regulations to industries which take government contracts is an example. The Robinson-Patman act, supplementing and expanding the older Clayton act, is another example. Both are incapable of interpretation, according to legal talent of all kinds, until the courts and the Federal Trade Commission have decided specific instances of alleged violation. However, one has only to read the 1933 codes of the various industries to understand the purpose and objectives. Although these new laws may have been hastily and crudely drawn,

their intent is honest—to cure some of the ills of unfair competition as defined by industry itself. They are only samples of what is to come if the Federal Government attempts to establish a law covering every little business detail which can be or may be used unfairly by unscrupulous people.

However unpopular labor organizations may be with some employers, we think industry will be far freer and more prosperous if matters of hours and wages are left to be compromised with labor organizations direct, without government interference, and other matters of unfair trade practices are left to the industries themselves. If wages and hours in competitive business organizations were the same, there would be a mighty good foundation to build on from which to eliminate other unfair business practices.

There is a widespread belief, of course, that labor organizers are labor agitators, because only by agitation can they keep their unions aware of their existence. If this is the case, the fault is not with labor organization as such, but with the character of its leaders, or organizers. That is the same problem we face in government and in the management of industry. But industry, dealing with labor organizations direct, is at least dealing with practical men who know what they want, and can go about getting it without having to interpret complicated laws.

To Produce Rip-Rap

Southwest Lime Co., St. Louis, Mo., has leased the quarry of the Pennsylvania-Dixie Cement Corp. at Gilmore City, Iowa, to produce rip-rap for a Missouri River improvement contract near Blair, Neb.

PWA Dilemma

President Roosevelt, in his "clarification" of PWA policy, has left poor Mr. Ickes in more of a quandary than ever, says an editorial in the *Chicago Journal of Commerce,* which continues: The first order, evidently dictated because of the President's impatience to get as many men as possible to work, said that only relief workers should be employed on PWA projects. Having been apprised of Mr. Ickes' objection to this, on grounds that PWA projects in contrast to WPA projects are to be lasting and hence required skilled workers who cannot be found on the relief rolls, Mr. Roosevelt altered the order to require that on up to 45% of the cost of each project, the federal government's share, relief labor must be used exclusively, but that the remaining 55%, the community's share, could be built by any labor at all requested by the community.

Since only about one-third of the cost of the average PWA project goes into payrolls, the remainder being used for tools, machinery and the like, Mr. Ickes wants to know whether the whole of this one-third should come out of the first 45% of the entire labor cost or only 45% of the 33⅓% had to be devoted to the employment of relief labor. Ickes argues that if municipalities are required to pay for materials and the skilled portion of the labor, they will have to foot approximately 90% of the bill for the average project.

Pending clarification of Mr. Roosevelt's "clarification," $300,000,000 of PWA funds are tied up, stagnant. That means the contracts are tied up, purchase of material and even the employment of relief labor—as well as the skilled labor which is necessary. You can hardly blame Mr. Ickes for being out of sorts.

New Manager For Rock Products

George C. Williams, new general manager of Rock Products, was born in St. Paul, Minn., in 1887. His 30 years' business experience has all been in the publishing industry, including some of the outstanding

George C. Williams

newspapers and trade magazines. Among the latter may be mentioned *American Architect, Building Age, Marine News,* etc.

The publishers believe that under Mr. Williams' management Rock Products not only will continue its undisputed leadership, but will go forward to increased usefulness to readers and advertisers, in every branch of this industry.

Buys Slag

Standard Slag Co., Youngstown, Ohio, has purchased the slag dump of the Kulka Co., Alliance, Ohio, at Leetonia, Ohio, formerly the property of the Cherry Valley Iron Co., said to contain about 500,000 tons, which will be removed and processed.

How Many Skilled Reliefers?

Washington, D. C.: The government has started a $1,500,000 check of its big work-relief employment list to find out exactly how many jobless have sufficient skill to saw lumber or lay brick for public works construction projects.

President Roosevelt hinted that results of the 2,400,000-person survey would determine the future of Administrator Harold L. Ickes' PWA as a major New Deal agency.

If the study shows the federal relief roll has ample carpenters and bricklayers in cities throughout the country to build PWA's hospitals and schools, Mr. Ickes will be allowed to spend his $300,000,000.

If the census reveals a shortage of skilled work-relief labor, the administration's one-time leading relief organization will have its golden stream of allotments reduced to a bare tinkle.

RFC Loan Denied

American Portland Cement Co., Foreman, Ark., did not get the RFC loan it anticipated through the activities of a local congressman to complete a promotional project, and its chairman of the board of directors has been belaboring the chairman of the Federal Reserve Board as a result. The *New York Journal,* August 4, gave considerable publicity to his complaint.

Buys TVA Power

Volunteer Portland Cement Co., Knoxville, Tenn., is reported to have signed a contract with Tennessee Valley authority for all of its electric power for ten years beginning next April 15. Chas. S. Lewis, plant manager, estimated the company would save from 30 to 40% in power charges or from $30,000 to $40,000 a year during an average favorable year. The company now buys power from the Tennessee Public Service Co. Last year the company used between 14 and 15 million kilowatt hours and paid TPS around $125,000 for it. The plant has a capacity of 1,125,000 bbl.

Pittsburgh Limestone Corp. plant on Buffalo Creek, near Worthington, Penn. Note part of old quarry face and corner of drift mouth at lower end of incline

IN WHICH LIMESTONE UNDERGROUND MINING COMPETES WITH OPEN QUARRYING IN PENNSYLVANIA

"Above" *versus* "Below" COMPETITION

By R. W. Stone
Harrisburg, Pennsylvania *

IN 1925 U. S. Bureau of Mines made a study of underground limestone mining and found 64 active limestone mines in the United States. In May, 1935, the writer looked into the subject in Pennsylvania and visited some of the 33 limestone mines in this State, 18 of which were operating when the demand for flux and crushed stone was slack.

The aim of the 100-page Federal report (U. S. Bureau of Mines Bulletin 262) was "to help the superintendent and the operator to adopt the safest and most efficient methods of removing rock underground." The idea of my article is to call further attention to this method of producing stone.

Of the active mines, 3 are producing primarily for portland cement, 7 for flux, 4 for lime, 1 for whiting and the rest for highway material. All the mines are drifts or tunnels in nearly flat-lying beds, except 2, which are steeply-inclined shafts.

All but 3 of the mines are in the western part of the State. Some of them extend a mile or more underground and have removed many acres of stone. Others are small affairs but serve a useful purpose nevertheless. The principal limestones mined are the Vanport where it is 10 to 20 ft. thick; the Loyalhanna siliceous limestone which ranges up to 50 or more feet; and the Greenbrier which is around 12 ft.

*Published with permission of the State Geologist.

New Castle Lime and Stone Co. plant at Kittanning, Armstrong County. Seen from barge on Allegheny River. Mine mouth is near top of picture

Power shovel loading cars in a Vanport limestone mine

In the smaller mines, the stone is extracted by driving single or parallel entries; in the larger mines the room and pillar method is used. Rooms and pillars are 20 to 50 ft. wide. Some limestone is left in the roof and very little timbering is required. Entries range up to 30 ft. wide, depending on the height of the stone taken.

In mining the very thick beds it is customary to cut a 7-ft. slice at the top the full width of the entry or room. Drillers starting this cut work on an elevated platform mounted on a truck. This first cut is advanced 15 to 25 ft. and the stone loaded out. The second cut takes up 15 to 17 ft., and the third and deepest cut takes down to the floor.

In the larger mines and some of the small ones drills are operated by compressed air and loading is done by electric tunnel shovels. The following brief description is arranged by counties.

Armstrong County Has Some Large Modern Mines

Pittsburgh Limestone Corp., a subsidiary of the United States Steel Corp., has two large stone operations in Armstrong County. One is between Kaylor and Bradys Bend on Sugar Creek in the northwest corner of the county. Three extensive mines at this locality are in the Vanport limestone, which is 14 to 20 ft. thick. The upper 2 ft. is left in the roof and a foot or more of siliceous rock is left in the floor. About 12 ft. of stone is taken. Rooms are 40 ft. wide with 20-ft. pillars. Very little timber is required.

The plant has a daily capacity of 3000 tons. Most of the product is for blast furnace use, and the finer sizes go into road construction and to portland cement mills.

The other plant of the Pittsburgh Limestone Corp. in Armstrong County is on Buffalo Creek about 2 miles southwest of Worthington. The Vanport limestone here is about 18 ft. thick and divided into distinct beds, according to B. L. Miller.

Section in Buffalo Creek mine:

Shale	Ft.	In.
Gnarly limestone	1	6
Thin shale parting		
Gnarly limestone	1	6
Thin shale parting		
Thin-bedded "shelly" limestone	2	0
Shale parting		
Gray limestone, best grade	8	9
Blue to black limestone	4	3
Bluish black shale		

The two layers of gnarly limestone are not touched because they make a roof that stands for years without other support than the 20-ft. pillars between 40-ft. rooms. The 13 ft. of blue and gray limestone are mined first, and then the "shelly" bed is shot down. So, 15 ft. of the 18-ft. bed are taken.

From the drift mouth to the power house inside the mine is about a quarter mile. The mine and crushing plant are operated by electric power, including electric shovel loaders. The primary product is flux stone and the capacity 3000 tons per day. Smaller sizes are produced, on demand, for road and concrete aggregate.

New Castle Lime and Stone Co. operated a mine in the Vanport limestone in 1935, leased from the Kittanning Limestone Co. The mine is high in the bank of the Allegheny River opposite Kittanning. The limestone bed is 12 to 14 ft. thick. About 9 to 10 ft. are taken, leaving 3 ft. in the roof and 6 in. in the floor. A little-understood fault crosses the property and the limestone is absent in the first 1500 ft. of the mine

Mine shaft and lime plant, American Lime and Stone Co., Bellefonte, Centre County

Entrance to Annandale mine, Butler County—Pittsburgh Limestone Corp.

drift. The working face in 1935 was about ¾ mile from the portal.

Mining is on the room and pillar system, with 50-ft. rooms and 20-ft. pillars. Entries are 12 ft. wide and 9 ft. high. Practically no timbering is required. Compressed air drills are used. Loaded cars are gathered with mules and hauled out by gasoline motors. About 30 acres have been mined out.

The crushing and screening plant is on the steep river bluff below the mine. Shipment is by rail, barge and truck. The output used to be sold mainly for flux, but the market in 1935 was largely road construction. About 600 tons per 8-hour day is capacity.

Another mine in the Vanport limestone is that of the **Allegheny River Limestone Co.** (formerly Templeton Limestone Co.) in the northern part of the county about one mile south of Templeton. The mine was opened about 1890. The 10-ft. bed is mined by air drilling and electric motor haulage for flux and road metal. The entry extends back about one mile under cover, and developments make possible an output of 1800 tons a day. Entries are 20 ft. and rooms are 30 ft. wide and 8 ft. high, leaving 18 in. of low grade limestone in the roof, overlain with 18 in. of iron carbonate.

An abandoned mine on the Upper Freeport limestone 1½ miles above Apollo was operated about 15 years ago, producing 500 tons daily for the Pennsylvania Highway Department. The bed is 10 to 12 ft. thick and was mined in 26-ft. rooms on 45-ft. centers. Some limestone was left in the roof of entries but not in the rooms, where the overlying shale held up well without timbers.

Beaver County Has Inactive Mine

Just south of Ellwood City, in Beaver County, the **Clydesdale Brick and Stone Co.** formerly mined the Vanport limestone to make lime. From the quarry face when overburden became heavy they drove five headings into the hill. These average 400 ft. long. The bed is 23 ft. thick and at least 17 ft. of stone was taken, leaving 4 ft. or more in the roof to support the overlying shales.

Air drills were used. Cars were loaded by hand and drawn out of the mine by horse. When last in operation some years ago this mine could produce 400 tons of road stone daily.

Butler County Has Many Active Mines

In Butler County, which lies north of Pittsburgh, more limestone mines have been opened than in any other county. Eight are on record and there may be one or two smaller ones. The mines now operated are at Annandale, Osborne, West Winfield and Wick.

Annandale: Probably the largest limestone mine in Butler County is that of the **Pittsburgh Limestone Corp.** In 1935 the face was nearly a mile from the entry and the capacity was 6000 tons per day. The product goes to the Pittsburgh district, most of it to furnaces for flux and some under ¾ in. to a portland cement plant. Large tonnages of crushed stone for road construction and concrete aggregate are also produced.

The Vanport limestone here is 19 ft. thick; 13 to 15 ft. is taken out. Entries and pillars are 30 ft. wide, rooms 40 ft. wide and ribs 20 ft. No timber is needed except near the outcrop but steel supports have been set in some places as an added assurance of safety. Forced ventilation is used and brattices are built of wooden boxes partly filled with sand.

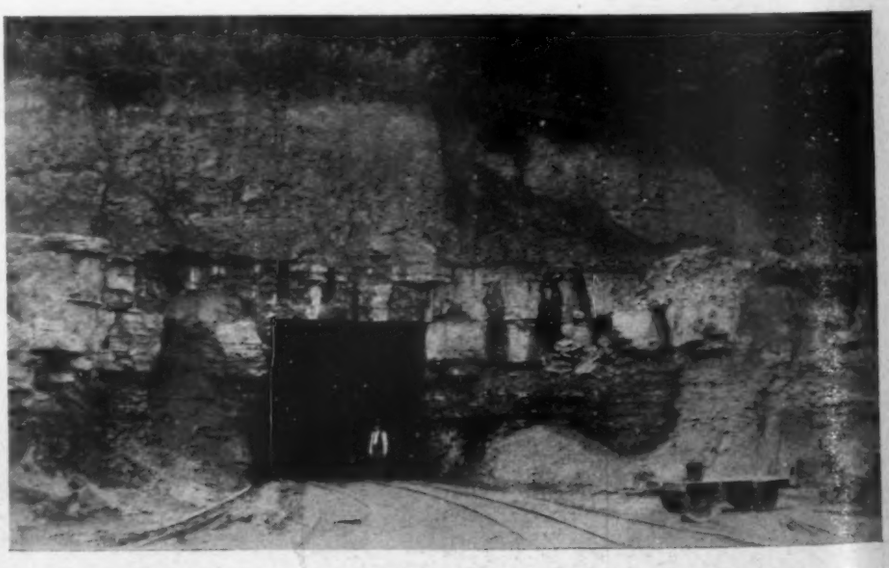
Large air compressors and other machinery are installed in a room far underground. Loading is done by air and electric shovels and mine cars are hauled by electric locomotives.

Branchton: The **Mercer Lime and Stone Co.** opened a mine half a mile east of Branchton many years ago in the Vanport limestone which is 18 ft. thick. The drifts had not been driven far when mining was discontinued, about 1920. The product was agricultural lime.

Harrisville: The **Pittsburgh Limestone Corp.** had a mine where the Vanport is 15 ft. thick. When in operation the stone was used for flux and portland cement and the output was 400 to 500 tons per day, but this mine has been idle several years.

Osborne: At this station on the Hilliards Branch of the B. & L. E. R. R. the **Grove City Limestone Co.** operates a mine in the Vanport limestone. Twelve feet of stone is taken from a bed 16 to 18 ft. thick, leaving 4 ft. in the roof. The face of the main entry is 2500 ft. from the drift mouth. Entries are driven 30 ft. wide and rooms 35 to 45 ft. Capacity is 800 tons per day. Mine cars are loaded by hand and by power shovel. The output is marketed mainly for roads, concrete construction and as pulverized agricultural limestone. Power shovels are used in the mine. All commercial sizes of crushed stone are washed to eliminate dust.

West Winfield: In the narrow valley of



Mouth of mine in Vanport limestone at Wampum, Lawrence County

Rougn Run down near the southeast corner of the county, limestone has been mined since 1894. In fact a mine at West Winfield is said to be the second oldest limestone mining operation in the United States. The Vanport limestone is here 18 ft. thick, has been mined for flux and for lime, and is now mined by the **West Penn Cement Co.** for portland cement.

Entries are driven 25 ft. wide and rooms 35 ft., leaving 25-ft. pillars. The height of all openings averages 20 ft. Mining is done by the breast-stoping method using hammer drills on tripods. Loading is done by electric and air shovels on crawler treads or on rails. Electric locomotives haul empty mine cars in one entry and loaded cars out the other entry. Many acres have been mined out and the farthest workings are a long way from the entry. The mine supplies stone for a plant making 5000 bbl. of cement per day.

Two mines, one on each side of the run, formerly operated here by the Pittsburgh Limestone Corp., have been abandoned.

Wick: The **Wick Lime Co.** has done some underground mining of the Vanport limestone on McDonald Run. The thickness of the bed ranges from 13 to 17 ft.

Centre County Has a Most Modern Mine

Bellefonte: One of the two shaft mines in the State is at Bellefonte. The **American Lime and Stone Co.** began underground mining on the Bellefonte ledge about 1920 by sinking an inclined shaft and working the stone by the shrinkage stope method. Although the cost of mining is somewhat greater than shallow open-cut quarrying, the stone is so much cleaner that it is profitable where the product is high grade and the strata as regular as they are in the Bellefonte region.

The shaft is in the footwall 80 ft. from the stone used. This shaft is 768 ft. long, inclined 52 deg. at the surface and curving to 80 deg. at the bottom. The mine is worked on several levels by overhand stoping methods. Drifts have been run considerable distances, up to 2855 ft. west of the shaft and not so far on the east.

Mine of Vang Construction Co. in Loyalhanna limestone, 3 miles east of Connellsville, Fayette County. Lift platform and air tank on crawler

The Bellefonte limestone ranges from about 30 to 75 ft. thick. Stopes are from 100 to 300 ft. high on 300-ft. centers with 50-ft. pillars. The capacity of the mine is about 1600 tons per 8-hour day. Most of the output is made into lime.

Fayette County Has Mines for Highway Stone and Ballast

Connellsville: The **Vang Construction Co.** is operating a mine in the Loyalhanna limestone about 3 miles southeast of Connellsville in the gorge of Youghiogheny River. Four parallel drifts have been driven in the face of an old quarry. Two drifts are about 500 ft. long and the two now in use are in about 1000 ft. Drifts are 40 ft. wide, with 40-ft. pillars. Butt headings are the same width and some of them have been driven 300 ft.

As the deposit is 62 ft. thick, and 45 to 50 ft. of it is mined out, a large quantity of stone is produced with very little advance of the workings. Drills are operated by compressed air, loading is done by a Marion electric crawler shovel, and cars are hauled by third-rail electric motor.

As the stone is very siliceous, the product is crushed for highways and railroad ballast. The daily capacity is 1000 tons.

Dunbar: The siliceous Loyalhanna limestone is 55 to 60 ft. thick near Dunbar and one of the large quarries of the State is 2 miles east of the borough. The face is 2000 ft. long. Where the overburden is excessive the **New Castle Lime and Stone Co.** has driven three entries. In 1935 each was about 1000 ft. long. The entries are 30 ft. wide, with 40-ft. pillars. From 47 to 50 ft. of limestone is taken, leaving several feet to support the roof.

In mining, it is customary here, as in some thick beds, to mine the stone in three benches, about 7, 17, and 23 ft. thick beginning at the top.

Drills are operated by compressed air and the broken stone is loaded by two electric shovels directly into automobile trucks which haul it to the crusher, where the stone is prepared for railroad ballast and highway construction.

Interior of Vang Construction Co. mine near Connellsville. Entry is about 30 ft. high

Lawrence County Quarries Changed to Mines

Chewton: The Vanport limestone outcrops on both sides of Beaver River at Chewton and has been quarried extensively, long scars showing on the hillsides. When the overburden increased to 50 ft. at the quarry of the **Consolidated Stone and Mining Co.**, 1¼ miles southeast of Chewton, underground development was started in 1925.

As the Vanport is about 22 ft. thick and only 2½ ft. need be left in the roof, full 19

Interior of Vang Construction Co. mine in Loyalhanna limestone, near Dunbar, Fayette County

ft. of stone could be taken. Drifts were driven 30 ft. wide, leaving pillars of the same width. The mine has been idle since 1932, but when in operation it can produce 1000 tons of stone per day. The main heading is more than 1000 ft. long. Air drills are used and loading is done by an air-operated Erie tunnel shovel. The output of this company is crushed stone and lime.

Hillsville: Over on the Ohio line west of New Castle are several very large quarries on the flat-lying Vanport limestone. For years the largest operation in the area has been the quarry of the **Geo. W. Johnson Limestone Co.** The face of the more or less circular quarry is 2¼ miles long. As the bed is about 20 ft. thick it is readily appreciated that the quantity of stone taken from this one quarry is large. Where the overburden is 55 ft. and therefore unprofitable to remove, mining may be done underground. Only main entries have been driven. This property is now operated by the **Pittsburgh Limestone Corp.**

Wampum: The outcrop of the Vanport limestone on the steep hillside south of Wampum is marked by a long open-cut quarry. The quarry is narrow because the overburden increases rapidly as operations extend back from the outcrop. In this vicinity mining is cheaper than open-cut work when the overburden exceeds about 25 ft.

Mining was begun about 1911 and now there are two large mines, the Crescent and the Cambrian. The main heading of the Crescent mine has been driven south 4000 ft. and that of the Cambrian mine 1500 ft. The Cambrian mine on the far side of Wampum Run was opened when the exhaustion of the stone in the Crescent mine was approaching.

The limestone is about 18 ft. thick. Entries are cut 10 ft. high, leaving 8 ft. of limestone in the roof, and only 4 ft. is left in the roof of rooms. Mining is done on 60-ft. centers, leaving 30-ft. pillars. The mines are operated by the Medusa Portland Cement Co., formerly the Crescent Portland Cement Co.

Montgomery County Has New Mine

Only two limestone mines in the eastern half of the State are known to the writer, and of these one is a shaft mine.

Bridgeport: A long-abandoned marble quarry at Henderson Station, near Bridgeport, which is across Schuylkill River from Norristown, was acquired by **Thompson-Weinman and Co., Inc.,** a few years ago. This open pit is 175 feet deep on highly inclined beds. The new owners developed the property by sinking a 25-ft. shaft in the bottom of the pit and driving a crosscut tunnel on the 200-ft. level. Drifts were driven at right angles to the crosscut on two beds of marble to the property lines and subsequent extraction was from overhead stopes.

A new inclined shaft has been sunk from the surface to a depth of 300 ft. and new levels driven on each of the three marble bands. Overhead stoping is now progressing from the 300-ft. up to the 200-ft. level.

The product is all pulverized for filler, whiting and other uses.

Somerset County Has Small Mines for Lime and Crushed Stone

Garrett: The **Romesberg Stone Co., Inc.,** opened a quarry in the Loyalhanna limestone in the gorge 2 miles west of Garrett about 1924. The site is in the north bank of the Casselman River. By 1933 the overburden had become so heavy that mining was begun. Three entries have now been driven about 125, 175, and 200 ft. with 40-ft. ribs. The entries are about 40 ft. wide and 26 ft. high. Mining is done by air drills. A 7-ft. bench is cut at the roof, the driller standing on a platform built on a crane mounted on an automobile truck. When the top cut has been made and loaded out, successive benches are taken until the floor is reached, leaving a vertical face. The face is advanced by repeating this operation. The broken stone is loaded by hand into motor trucks and hauled to the crusher. The product is road stone, 95% of which is delivered direct to the job by truck. The capacity of the plant is 250 tons in 8 hours.

The Loyalhanna limestone is about 52 ft. thick at this place and only the lower half is mined.

In the river bluff a quarter of a mile east of the mine described above, Frank Romesberg has driven an entry about 50 ft. on the Greenbrier limestone. The entry is 7 to 8 ft. high and 15 ft. wide. The stone was burned for agricultural lime.

Meyersdale: About two miles east of Meyersdale at Keystone Junction **A. C. Lottig** (R.D. 3, Meyersdale, Penn.), is mining the Greenbrier limestone and burning it in two shaft kilns for agricultural lime.

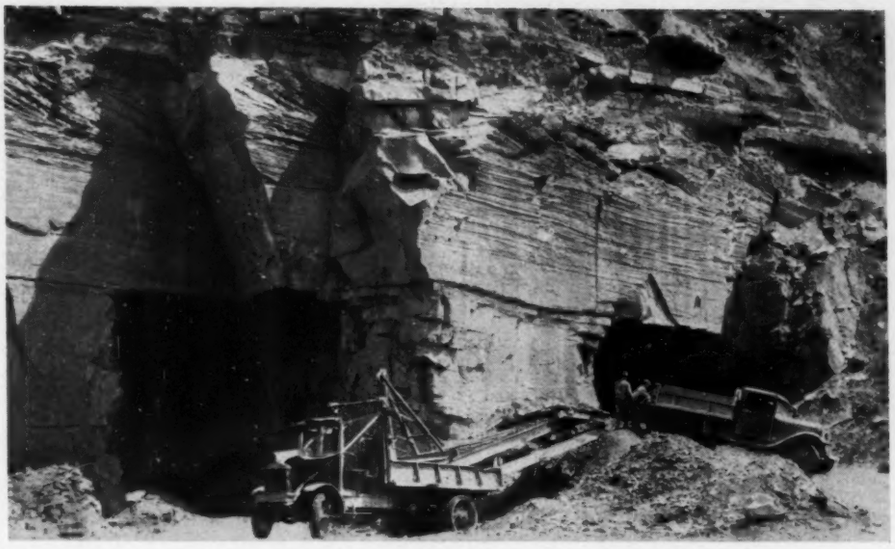
Gorge of Casselman River, 600 feet deep, seen from top of Romesberg Stone Co. mine, showing crushing and screening plant on B. & O. R. R., near Garrett, Somerset County

The entry is high on the mountain side and the bed, which is about 8 ft. thick, has so much pitch (15 deg.) that rooms are turned off only on one side of the drift. The face is 350 ft. from the drift mouth. Rooms are 7 ft. high and 18 ft. wide. All mining, loading and tramming is done by hand methods. The capacity of the mine is 10 tons per day.

Salisbury: On the north bank of Piney Creek, two miles southeast of Salisbury, the Greenbrier limestone has been mined for forty years or more. The outcrop is on a steep hillside and the bed rises into the mountain at 10 deg. The entry is at road level, about 40 ft. above the creek, and the two kilns are on the lower side of the road. This gives down grade from the working face in the mine to the top of the kiln. The mine, which belongs to the Maust **Lumber Co.**, Salisbury, is worked intermittently for agricultural lime. In 1935 Earl **Baer** was mining from 9 to 12 ft. of hard, bluish grey stone of good quality. A steam engine operates a compressor for the drills. The first drift was driven about 300 ft. Then, because there was no need for working so far from daylight, a second drift was started, parallel with the first and with a 15 ft. rib. This second drift is 200 ft. long with two break-throughs. Loading is done by hand to a single mine car.

On the opposite side of Piney Creek nearby on the **Johns Brothers** farm a lower limestone is mined intermittently by farmers for burning in open heaps. The original drift is caved and a new one opened about 1932 is driven about 40 ft. up the dip on a bed of limestone 8 ft. thick. A compressed air drill is used.

Somerset: **Harry W. Shumaker** is mining the Lower Freeport limestone four miles southeast of Somerset in a drift now 700 ft. long which was started about fifteen years ago. The limestone is 8 ft. thick and the overlying coal 2½ ft. thick is taken down for burning the limestone in an old stone kiln. A similar drift opened more than fifty years ago and mouthing at the kiln is now fallen shut. The lime is used for agricultural purposes.



Mine entrances in Loyalhanna limestone. The limestone is highly siliceous and cross-bedded. Truck in foreground has a lift platform from which miners drill top bench

Other Mines: Several other limestone mines have been opened in Somerset County. Some of them found the bed pitching into the hill and were shortly abandoned because of the difficult working. Others with favorable conditions are worked more or less regularly.

At Glessner, near Boswell, **Berkey Brothers** are mining limestone, probably the Lower P.ttsburgh, taking the upper half of a bed 9 to 12 ft. thick. A foot or more of coal lying directly on the limestone is recovered and used for burning the stone to agricultural lime. The entry is about 300 ft. long and rooms are cut 20 ft. wide. The shale above the coal forms a good roof.

A mine 1½ miles southeast of Stoyestown was worked until 1920 for agricultural lime and more recently by the Quemahoning Coal Co. for crushed stone. This bed in the Conemaugh group is 5½ to 6 ft. thick.

A mine 2 miles southeast of Stoyestown and one near Acosta are small openings for agricultural lime but not worked regularly.

York County Has Modern Operation

West York: Universal Gypsum and Lime Co. (formerly the Palmer Lime and Cement Co.) has a large pit quarry in flat-lying beds about ¾ mile south of West York. In order to get more of the high grade stone without disturbing the surface, four drifts have been driven from the quarry face underground. These entries are 20 ft. high, 40 ft. wide, and several hundred feet long. Timbering is not required. The rock is used for whiting and for chemical and agricultural lime.

Acknowledgement: A few of these mines are described more fully in Limestones of Pennsylvania by B. L. Miller: Pennsylvania Topographic and Geologic Survey Bulletin M-20, 729 pp., 1934. That text was completed in 1930. Six sentences in the foregoing paper are direct quotations from that report.

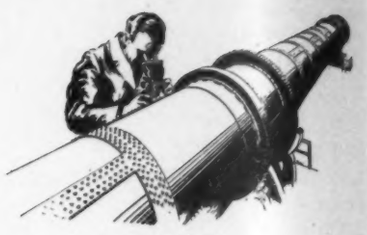
Face of drift, Romesberg Stone Co. mine, near Garrett. Auto truck with lift platform in use

Concrete Pavement Yardage

AWARDS of concrete pavement for July, 1936, were announced by the Portland Cement Association as follows:

	Sq. yd. awarded during July, 1936	Total sq. yd. for year to date, Aug. 1, 1936
Roads	6,208,249	19,730,409
Streets	1,666,344	8,213,002
Alleys	38,656	207,923
	7,913,249	28,151,334

What Takes Place Inside the Rotary Cement Kiln



By Alton J. Blank

General Superintendent and Supervising Chemist, Cementos Atoyac, S. A., Puebla, Puebla, Mexico.

IN THE BURNING of portland cement clinker in the rotary kiln we find the raw mixture being fed into the feed end of the kiln on the one hand, and fuel and the air necessary for atomization and combustion being fed into the discharge end of the kiln on the other hand.

From recording instruments we learn that certain temperatures are had inside the kiln, and from analyses of the waste gases we learn something of the combustion and degree of calcination. From chemical analyses and physical tests made upon the clinker we determine whether or not the proper reactions between the various components of the raw mixture are taking place. In view of the fact that only the waste kiln gases leave the feed end of the kiln on the one hand, and the burnt clinker leaves the discharge end of the kiln on the other hand, it is usually from analyses of these that theoretical calculations can be made as to what goes on inside the kiln itself. These calculations in themselves are often found, by accident and otherwise, not to give the whole picture, and we run upon a number of things that cannot be explained consistently, and are variable factors involving the kiln's operation from hour to hour and from day to day.

With the shutting down of an 8 ft. x 131 ft. kiln some time ago for relining, the writer, out of curiosity, obtained samples of the coating adhering to the brick throughout the length of the kiln and made chemical analyses of each sample taken.

Sample No. 1 was taken from the brick coating in the kiln hood, while samples No.'s 2 to 32 were taken at spaced intervals throughout the length of the kiln, and sample No. 33 was taken from the coating adhering to the kiln feed pipe. The chemical analyses of these samples are found in Table 1.

TABLE 1—CHEMICAL ANALYSES OF SAMPLES

Sample No.	SiO_2	R_2O_3	CaO	MgO	SO_3
1	22.96%	7.44%	66.37%	1.44%	1.71%
2	22.92	8.92	64.64	2.01	1.37
3	23.04	7.58	64.37	3.92	1.02
4	22.00	7.78	63.49	5.68	1.02
5	22.90	7.06	51.17	17.90	.92
6	22.12	8.64	49.25	19.08	.85
7	21.04	7.76	54.47	14.38	1.33
8	22.40	8.58	56.24	10.93	1.88
9	20.36	8.64	65.67	2.38	1.71
10	22.04	8.76	60.81	3.65	2.81
11	18.20	9.58	58.87	9.64	1.95
12	21.62	8.60	51.37	13.99	2.84
13	20.44	8.06	62.53	5.35	1.54
14	20.38	8.80	61.76	4.16	2.74
15	21.62	8.80	62.43	2.65	1.98
16	21.18	8.36	61.56	4.64	2.46
17	20.62	7.18	62.92	2.25	5.65
18	21.40	8.44	60.66	2.17	5.59
19	21.06	7.62	61.30	2.60	4.10
20	21.00	8.04	60.30	2.75	5.41
21	21.66	6.96	54.48	8.54	5.48
22	19.90	7.12	55.63	9.19	4.28
23	20.06	7.84	51.11	10.35	6.34
24	20.86	8.00	44.71	13.74	6.65
25	20.12	8.36	55.38	2.53	8.79
26	19.42	8.00	51.52	3.25	11.49
27	20.50	8.62	50.72	2.02	10.70
28	20.16	7.54	50.72	2.02	15.35
29	20.00	6.96	61.73	1.80	3.87
30	19.40	6.62	63.06	2.67	5.31
31	19.40	6.90	55.84	1.80	10.39
32	18.82	6.66	56.61	1.80	11.62
33	18.04	6.34	59.76	1.59	8.74

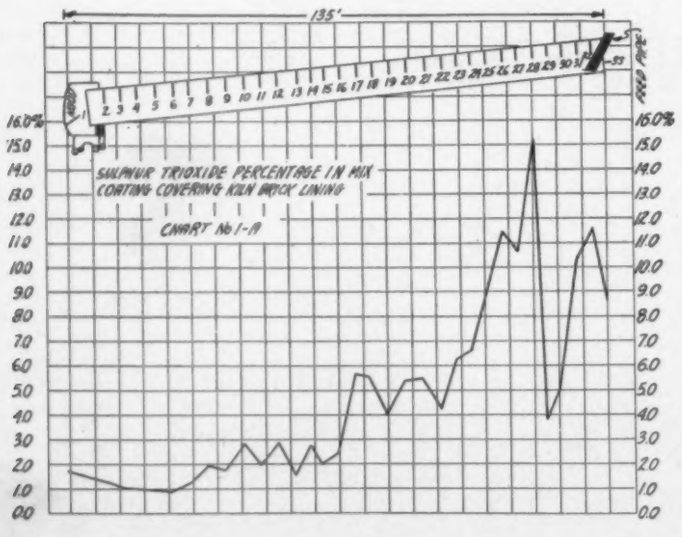
The thickness of the coating adhering to the brick throughout the burning zone of the kiln ranged between 3 and 6 in., tapering off gradually to 1 in. through the decarbonization zone and down to ½ to ⅛ in. through the preheating zone to the kiln feed pipe. Coating covering the brick in the kiln hood averaged ½ in. in thickness, while coating over the kiln feed pipe ranged between 3 and 5 in.

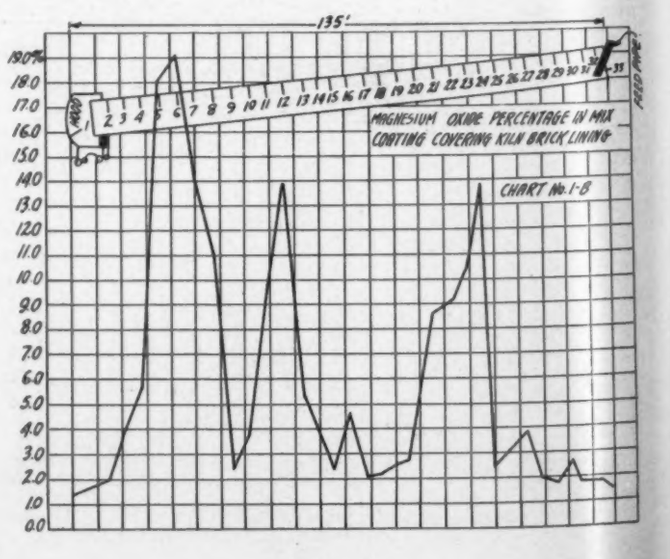
Variations in the chemical composition of the coating were found to be greater, by far, in the sulphur trioxide and magnesium oxide components, and these have been plotted in charts 1-A and 1-B.

Practically all of the samples showed the sulphur content to be present in part as sulphide, suggesting that a reducing atmosphere was had in the kiln previous to its being shut down for relining.

Second Series

About a month later the same kiln was again forced down due to mechanical difficulties, and it was thought a good opportunity to again sample the coating adhering





to the kiln brick to determine whether conditions and results were comparable with those found in the first instance. Accordingly, samples were again taken throughout the length of the kiln at intervals approximating those of the first test. At the same time samples of the calcined and semi-crude materials present in the kiln were taken for analyses.

The chemical analyses of the second lot composing 33 samples of coating adhering to the kiln hood, brick and feed pipe, are shown in Table 2.

TABLE 2—SECOND SERIES OF CHEMICAL ANALYSES OF SAMPLES

Sample No.	SiO_2	R_2O_3	CaO	MgO	SO_3
1	23.00%	8.02%	66.25%	1.59%	1.20%
2	22.60	6.98	65.64	1.84	2.02
3	21.06	8.90	65.70	2.17	1.26
4	21.60	8.04	64.01	5.10	1.20
5	21.96	7.94	62.36	16.17	1.47
6	22.38	8.90	48.49	17.97	1.71
7	22.00	8.58	56.96	9.91	2.50
8	20.94	8.90	63.98	2.65	2.57
9	22.96	9.54	62.53	2.16	2.40
10	23.00	9.44	62.19	1.66	3.25
11	23.00	9.20	56.20	8.45	1.95
12	23.44	8.06	62.94	2.02	2.74
13	21.20	8.20	62.71	2.09	4.90
14	21.62	8.80	61.98	1.88	5.04
15	20.40	8.18	63.72	1.66	4.28
16	21.22	8.06	64.50	1.80	3.94
17	21.06	8.62	58.66	5.93	4.11
18	20.80	8.60	62.38	2.17	4.95
19	20.64	8.98	56.92	1.95	9.53
20	19.60	8.08	62.98	.94	5.48
21	19.72	7.90	62.74	.91	5.53
22	19.20	7.00	57.50	2.02	10.74
23	19.60	7.42	59.21	2.24	7.50
24	19.60	6.12	60.17	2.17	6.76
25	20.00	7.96	59.40	2.38	7.78
26	20.44	3.38	59.60	2.02	6.96
27	19.94	8.06	57.87	1.95	7.03
28	20.42	7.64	59.01	2.02	8.40
29	20.42	7.38	59.21	1.88	9.43
30	19.60	7.40	57.30	1.59	11.40
31	19.80	7.08	55.58	1.66	13.20
32	19.00	5.44	55.58	2.17	13.53
33	19.04	5.60	49.20	1.44	22.76

The thickness of coating adhering to brick throughout the length of the kiln in the second sample was approximately identical with that found in the first.

Again, the greater variations as to composition were found in the sulphur trioxide and magnesium oxide contents of the coating, and these have been plotted in Charts 2-A and 2-B.

In Chart 4 the silica, iron and alumina and the calcium oxide contents of the coating are plotted, while in Chart 5 the calcium oxide content of the coating is plotted along with the sulphur trioxide and magnesium oxide contents.

Perusal of Chart 4 shows that very little irregularity is had in the percentages of silica, iron and alumina, and that this irregularity has little bearing on the variation had in the calcium oxide curve.

However, in Chart 5 the variation in the calcium oxide content of the coating is found to have a direct bearing, or relation, to the variations had in the sulphur trioxide and magnesium oxide irregularities.

As in the first instance, practically all samples of the kiln coating showed presence of sulphide sulphur, further suggesting that a reducing atmosphere prevailed in the kiln previous to its abrupt stoppage.

TABLE 3—CHEMICAL ANALYSES OF CONTENTS OF KILN

Sample No.	% SO_3
1	0.64
2	0.54
3	0.64
4	0.51
5	0.58
6	0.72
7	0.64
8	0.88
9	1.33
10	1.76
11	1.70
12	1.99
13	2.38
14	3.27
15	2.41
16	1.76
17	1.24
18	1.76
19	1.01
20	0.83
21	0.97

In this second instance the samples of crude, semi-crude and fused material taken from the kiln were analyzed for sulphur trioxide content. Unfortunately, these samples were prematurely discarded from the laboratory, through accident, before complete chemical analyses could be made. The sulphur trioxide content of the 21 samples taken are shown in Table 3.

In each of the above samples sulphur sulphide was found present. The sulphur trioxide content of the samples as taken from their respective positions in the kiln, will be found plotted in Chart 2-C.

In this second instance additional samples of the collected dust found in the hoppers of the kiln dust chamber, of which there were five compartments, and from the base of the kiln stack, were taken. The sulphur trioxide and calcium oxide contents of these samples were determined and are shown in Table 4.

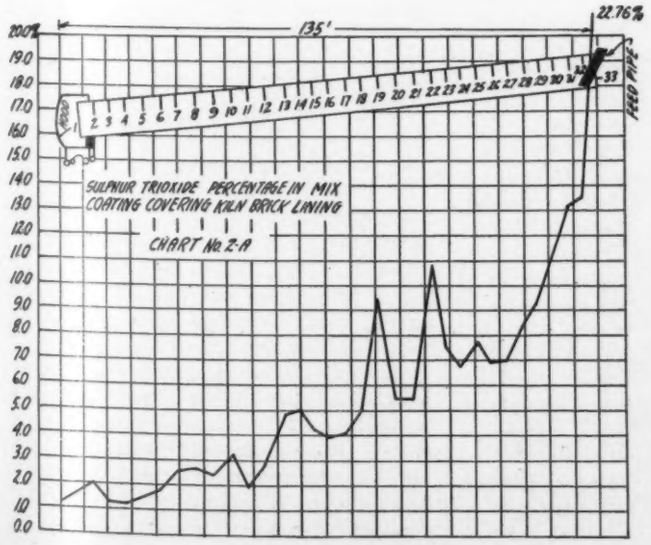
TABLE 4—CHEMICAL ANALYSES OF STACK DUSTS

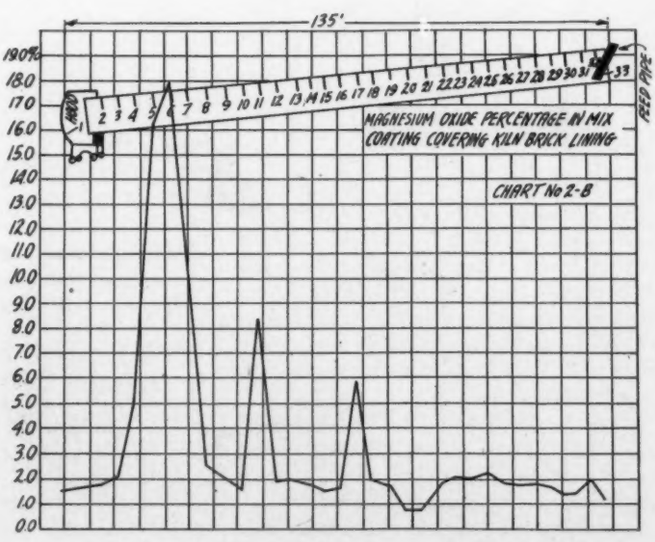
Sample	SO_3%	CaO%
1st dustchamber	11.65	53.23
2nd dustchamber	16.16	55.41
3rd dustchamber	17.29	57.09
4th dustchamber	19.01	58.37
5th dustchamber	21.87	59.11
Base of stack	25.36	59.97

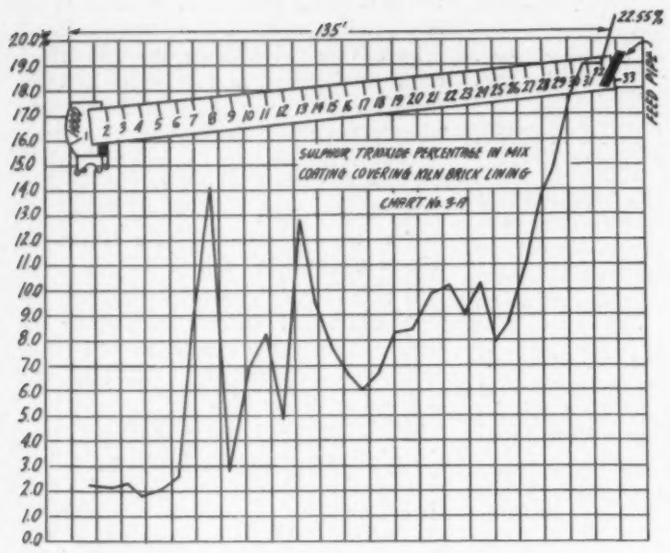
The sulphur trioxide and calcium oxide contents of the flue dust samples in the several dust chambers and from the base of the kiln stack are found plotted as Charts 2-C and 2-D respectively, in Chart 6.

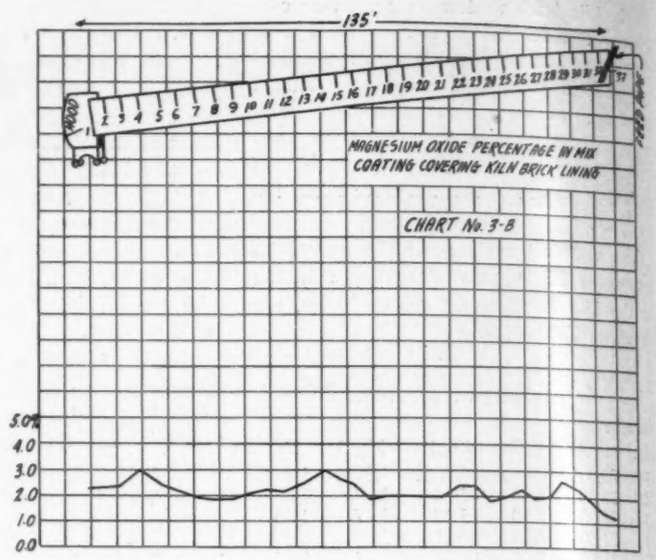
Third Series

On a later and third occasion, due to the filling up of available clinker storage space, it became necessary to shut down the kiln in question, and as on the two previous occasions, samples were again taken of the kiln coating adhering to the brick throughout the length of the kiln, as well as from









the dustchambers and from the base of the stack.

The chemical analyses of the third lot of samples are shown in Tables 5 and 6.

TABLE 5—CHEMICAL ANALYSES OF THIRD SERIES OF SAMPLES

Sample No.	SiO_2	R_2O_3	CaO	MgO	SO_3
1	21.96%	7.62%	65.32%	2.24%	.48%
2	22.38	6.44	66.01	2.24	2.26
3	22.64	6.26	65.90	2.30	2.38
4	22.44	7.98	64.19	2.89	1.88
5	22.00	8.60	63.98	2.38	2.08
6	22.24	8.54	64.55	2.17	2.67
7	20.20	8.16	59.78	1.88	9.12
8	18.48	7.36	56.91	1.80	14.23
9	21.20	8.00	64.55	1.80	2.91
10	22.00	8.06	60.00	2.02	6.98
11	20.84	7.26	60.35	2.17	8.28
12	20.76	7.14	63.16	2.09	4.95
13	18.44	8.32	56.91	2.44	12.85
14	18.80	8.10	58.06	2.89	9.55
15	20.14	8.22	59.35	2.66	7.71
16	20.18	8.96	60.26	2.37	6.58
17	23.06	9.54	57.64	1.95	6.03
18	24.20	10.18	55.75	2.38	6.61
19	21.26	7.94	56.96	2.38	8.33
20	21.44	9.04	56.02	1.80	8.36
21	20.08	8.00	56.40	1.95	9.86
22	20.00	7.60	55.07	2.01	10.29
23	20.60	8.14	54.98	1.88	9.02
24	19.60	7.44	55.07	2.01	10.21
25	20.80	7.60	55.88	1.80	7.95
26	20.40	7.20	54.70	2.20	8.71
27	20.00	7.64	53.85	1.84	10.80
28	20.16	7.60	50.64	2.01	13.79
29	19.60	7.56	49.11	2.31	14.81
30	18.80	6.82	50.01	2.53	18.40
31	18.40	5.80	46.22	1.95	19.01
32	17.56	6.18	44.80	1.44	18.99
33	17.00	6.06	42.29	1.27	22.55

The thickness of the coating adhering to the kiln brick to point 6 in the kiln ranged between 3 and 6 in.; between points 7 and 13 irregular ring formations were found ranging in thickness up to 14 in.; coating in decarbonization and preheating zones was found to be slightly thicker than in the previous two instances.

Sulphur sulphide was not found in any of the samples of kiln coating, thus suggesting that an oxidizing atmosphere was had in the kiln previous to its being shut down.

The sulphur trioxide and magnesium oxide contents as shown in Table 5 are plotted in Charts 3-A and 3-B.

Perusal of Chart 3-A shows an extraordinary concentration of sulphur trioxide in the decarbonization zone of the kiln and at the beginning of the burning zone. Comparison of the sulphur trioxide content at the feed end of the kiln, in this instance, shows something in common with results obtained in the previous two instances where the kiln was sampled and where sulphur trioxide curves are plotted in Charts 1-A and 2-A.

In this latter instance the magnesium oxide content of the samples of kiln brick coating vary little from one end of the kiln to the other, whereas, in Charts 1-B and 2-B there is found a great concentration of magnesium oxide in the burning zone of the kiln.

TABLE 6—CHEMICAL ANALYSES OF STACK DUSTS

Sample	% SO_3	% CaO
1st dustchamber	3.61	44.26
2nd dustchamber	7.49	47.18
3rd dustchamber	9.37	48.71
4th dustchamber	11.01	49.45
5th dustchamber	13.73	51.66
Base of stack	16.95	54.07

Sulphur trioxide and calcium oxide contents of the flue dust collected in this third instance are to be found plotted in Charts 3-A and 3-B in Chart 6.

Further Data

For the analyst who may care to make a study of the conditions as shown to exist from the data presented above, it may be stated that during the several months during which these tests were made, conditions as to raw materials and kiln control were normal. The fuel oil used for burning during this period averaged 5.5% S, while the average kiln feed and clinker as discharged from the kiln are as shown below in Table 7.

TABLE 7—CHEMICAL ANALYSES OF FEED AND CLINKER

Chemical Composition	Kiln Feed	Clinker
SiO_2	14.36%	21.72%
R_2O_3	6.52	9.66
CaO	43.04	64.98
MgO	1.32	2.57
SO_3	.44	.57

Summary and Conclusions

From the studies made from the analyses of the coating adhering to the brick inside the kiln in question, during the three times that samples were taken at different periods when the kiln was down, it would follow, after perusal of chemical analyses and curves plotted, that when reducing atmospheres are had in the kiln in question, a concentration of magnesium oxide is had in the coating found in the burning and decarbonization zones in the kiln, with a normal amount present in the preheating and feeding zones.

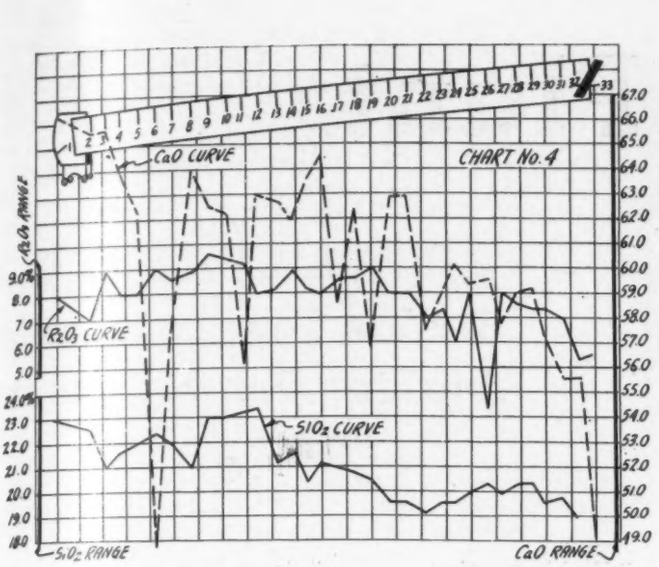
On the other hand, when an oxidizing atmosphere exists in the kiln, the magnesium oxide content of the coating is fairly uniform throughout the length of the kiln.

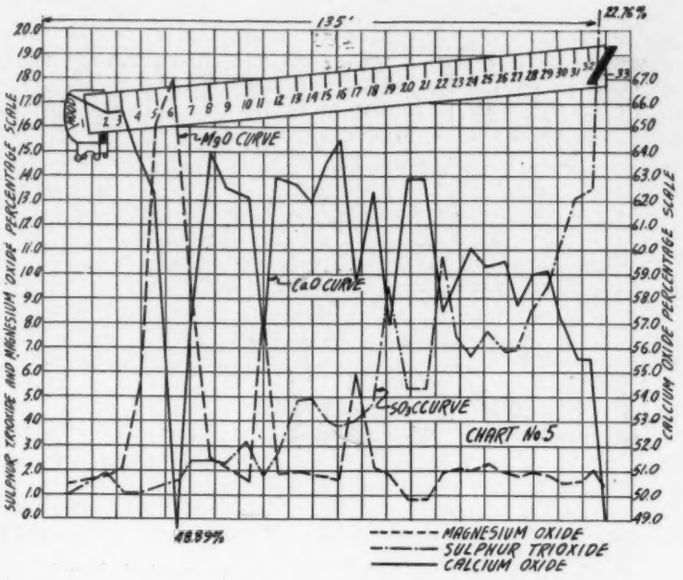
Again, when a reducing atmosphere exists, fairly uniform amounts of sulphur trioxide are found in the coating in the burning zone, while concentrations are to be found in both the decarbonization and preheating zones of the kiln.

On the other hand, when oxidizing atmospheres exist, there is found an abnormal concentration of sulphur trioxide in the burning zone, which results in ring formations, while fairly uniform amounts of sulphur trioxide are found in the rear of the kiln.

In connection with ring formations, the writer has definitely proved to his own satisfaction on any number of occasions in the past, that sulphur trioxide concentrations in the materials present in the kiln are a source of ring troubles.

Just why magnesium oxide concentrations are had in the coating when a reducing atmosphere is had in the kiln, and none of these concentrations or irregularities when oxidizing atmospheres are had, is not clearly understood by the writer. Neither is it understood why there are concentrations of





sulphur trioxide at the rear end of the kiln when reducing atmospheres are had, and concentrations of sulphur trioxide at the front of the kiln when an oxidizing atmosphere is had. Neither can there be a very clear explanation as to why greater concentrations of both sulphur trioxide and calcium oxide are had under reducing conditions, and lesser concentrations of these ingredients when oxidizing conditions prevail.

It would appear that conditions within the rotary cement kiln are rarely the same, but vary with factors that might include fuel, draft control, materials, their fineness and composition, the speed of the kiln, and the like.

As in other phases of cement manufacture, theory is of little use, and any theoretical calculations made on a kiln's performance, or on the product turned out, are of little value practically, for it is extremely doubtful that conditions within any given rotary cement kiln are constant for any length of time. From studies made it would appear that conditions vary from hour to hour and from day to day and are seldom, if ever, the same. Analyses of clinker discharged from a kiln over a period of 24 hours, with samples taken every five minutes, would suggest that this is the case.

Rock Wool Project

Air-O-Cel Industries, Inc., Stephenson Bldg., Detroit, Mich., has been incorporated and is making a public offering of 110,000 shares of $1 per share common stock, to residents of Michigan only, the net proceeds of which will be used to build and equip a plant for the manufacture of rock wool, and for working capital. The total issue is 200,000 shares, of which, including the above 110,000, there is 160,000 outstanding. The officers and directors are F. C. Reinke, president; L. A. Stoneman, vice-president; E. J. Trinklein, secretary and treasurer, and Otto Trinklein, director.

A Too Frank Editor?

Pearson, Ga.: The *Tribune* carried the following editorial on July 2:

PORTLAND CEMENT ASS'N ADVERTISING

The Portland Cement Association is putting on an advertising campaign in The Tribune, beginning the first of the series in this week's issue.

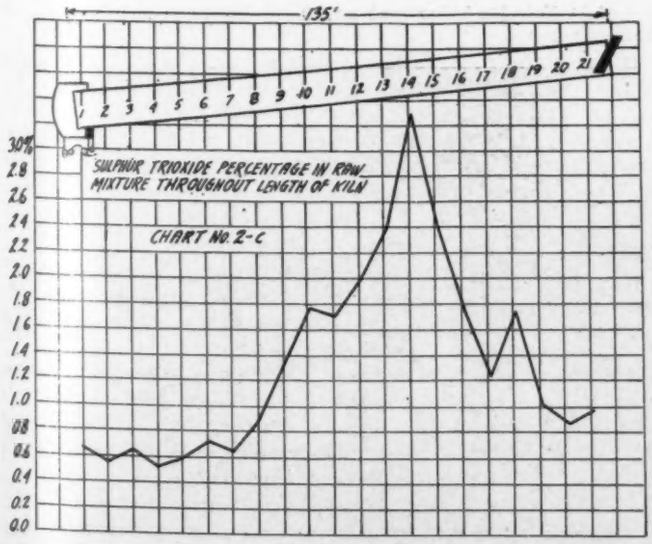
We all know that concrete is the best road paving material to be found, and is, in the long run, the most economical. Concrete, properly put down, will hold up longer than any other material, thus saving in upkeep over a period of years.

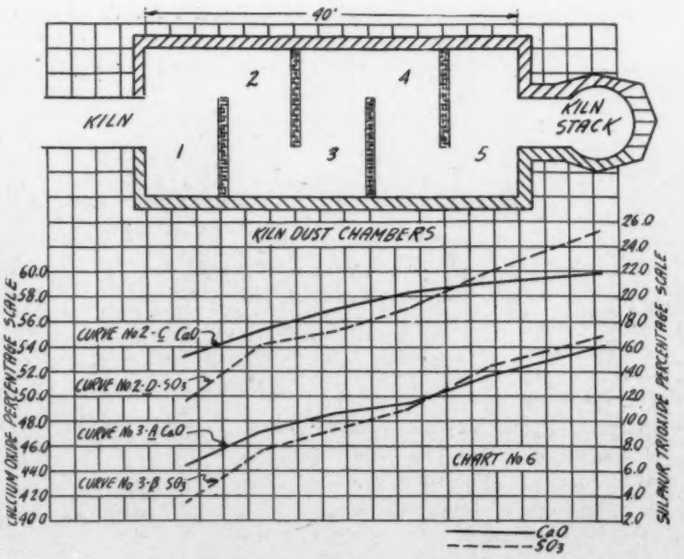
Let's all pull for concrete on Route 50 between Pearson and Willacoochee. We can get this stretch of road paved with concrete with a little united effort on the part of the citizens of the county, and at no extra cost to the tax payers.

Call at this office at once and let us get a campaign for concrete paving started. We will explain what we have in mind.

Fire Damage

Troy Gravel Co., Troy, Ohio, plant was damaged by fire on July 21. Started by a grass fire, the plant of the defunct Troy Trailer & Wagon Co. was destroyed.





Build NEW Plant To Replace The Old

GIFFORD-HILL & CO. Dallas, Tex., Constantly Making Improvements

GIFFORD-HILL AND CO., INC., Dallas, Tex., has improved two of its three Louisiana sand and gravel plants and has taken over a fourth plant. Present plants owned and operated in Louisiana by the company are located at Turkey Creek, Forest Hill, Trout and Sicily Island.

Turkey Creek Plant

A complete change has been made and a new, modern plant has been built and put into operation at Turkey Creek. The deposit at this location had previously not been worked since January, 1933. The new plant is erected 500 ft. closer than the old plant to the deposit being dredged. Work started on March 15 and the plant was put into operation on May 16 of this year.

The deposit is covered with from 7 to 19 ft. of overburden. Approximately 50% of the material is sand, the remainder being "metal" rock. The mixture of sand and gravel is pumped to a dewatering box and gravity screen at the edge of the lake by a 10-in pump, driven by a Fairbanks-Morse Diesel engine.

Left—Scrubber of new plant at Turkey Creek, La.

The discharge from the 10-in. pipe goes to a 6x12-ft. wood box, 5 ft. deep, over a ⅜-in. flat screen set at an angle of 30 deg. Dewatering takes place here, and excess water and sand (⅜-in. minus) pass back to the lake through a 2-ft. flume, 175 ft. long.

Gravel to be washed (⅜-in and over) passes over a 30-in. belt conveyor with 20-ft. centers and discharges to a scrubber 8 ft. in diameter and 22 ft. long. The scrubber was manufactured by the Carbo Foundry Co., Alexandria, La. Water is furnished in the scrubber by a 6-in. clear water pump, driven by a 25-hp. direct-connected G.-E. motor. The pump has a capacity of 800 g.p.m.

A cylindrical screen extension of ⅜-in. wire, 4 ft. long, is provided at the discharge end of the scrubber for dewatering the gravel. The excess water and screenings pass through a 1-ft. by 1-ft. flume back to the lake.

Gravel is carried up to the sizing screens on a 30-in. belt conveyor, equipped with Link-Belt idlers, measuring 105 ft. from center to center. The belt discharges to a

Below—Three screens set in tandem at Gifford-Hill & Co.'s Turkey Creek plant. Note bin below each screen. Conveyors on right lead to scrubber and discharge box

4-ft. by 6-ft. hopper, which in turn discharges to the sizing screens. Sizing takes place over three separate conical screens, manufactured by the Link-Belt Co., Chicago, Ill. The screens are each 8 ft. long with 7-ft. and 3-ft. end diameters, and are set in tandem, each at a 15-deg. angle. The top, center and bottom screens have 2-in., ¾-in. and ⅜-in. round punched holes, respectively.

Storage and Shipping

Three bins, each 12 ft. by 16 ft. in plan by 8 ft. deep, are set one beneath each screen. Gravel retained on the No. 1 screen passes by gravity to No. 1 bin. Gravel passing the 2-in. screen but retained on the ¾-in. screen passes to No. 2 bin, and gravel retained on the ¾-in. screen and on the ⅜-in. screen passes to bin No. 3. Wash water is applied at the sizing screens by the clear water pump.

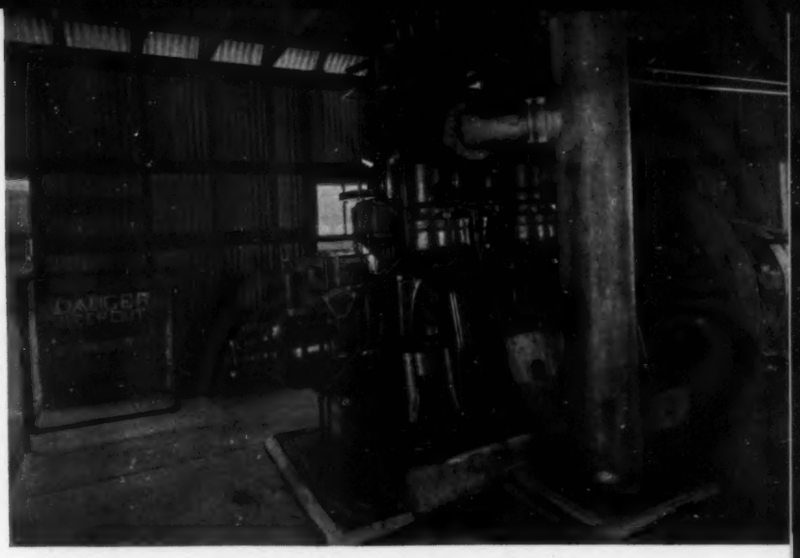
A 30-in. belt conveyor, manufactured by the Link-Belt Co., Chicago, Ill., 78-ft. centers, is set parallel to the railroad siding, with its lower end passing under the three bins. Gravel to be shipped passes up this conveyor to a small hopper. Gravel from the hopper passes by gravity to the cars through a chute with ⅜-in. wire on its end. Here the gravel is given a final rinsing before shipping.

Railway Ballast

Provision is made at the dewatering flat screen at the edge of the lake for "detouring" sand and unwashed gravel for railroad ballast around the scrubber to a loading hopper at the railroad siding.

A Telsmith sand tank is set in the 2-ft. by 2-ft. flume for recovering sand. A screen is set in the flume above the sand tank for recovering the size required. For example, a No. 6 mesh screen is placed when mason's sand is run. A 30-in. sand belt conveyor, with Link-Belt idlers, approximately as long as the gravel belt, carries sand direct to a small loading hopper at the railroad siding.

The same belt is used to carry gravel, which is not to be sized and washed. to the same loading hopper, where it is given a rinsing through a ⅜-in. wire screen in the chute to the cars. Any proportions desired of the sand and this gravel can be handled direct to the cars.



Diesel engine and generator at Turkey Creek

The following G.-E. motors drive the machinery necessary to operate the plant:

30 hp.—scrubber and conveyor to it—chain drive
20 hp.—gravel belt—V-belt drive
20 hp.—sand belt—chain drive
20 hp.—sizing screens—chain drive
20 hp.—loading conveyor—chain drive
25 hp.—water pump—direct drive

Electrical energy necessary to operate all plant motors is now being generated at the plant. A new power house was built and the Diesel-generator set and accessory equipment was installed this spring. A two-cylinder 120-hp. Fairbanks-Morse Diesel engine is direct-connected to a type D Fairbanks-Morse alternator and drives it at 257 r.p.m. The alternator is rated at 90 kv.a. and generates electrical energy at 2300 volts.

Both the water pump for supplying the cooling water for the engine and the excitor are driven from the main shaft of the Diesel-generator set. A 6-in. belt drives the Fairbanks-Morse, type c.p., shunt-wound exciter at 1400 r.p.m. It supplies 60 amperes at 125 volts. A 4-in. flat belt drives the 1½-in. Deming pump, which pumps water from a sump to the Diesel engine cooling system.

Compressed air at 200 lb. per sq. in. is necessary to start the Diesel. The compressed air is furnished by a model ADA 1002 air compressor manufactured by the Gardner-Denver Co. Specifications of the compressor are 3½-in. bore and 2½-in. stroke. The compressor is driven at 700 r.p.m. by a one-cylinder gasoline engine manufactured by the Wico Electric Co., through a 3-in. flat belt.

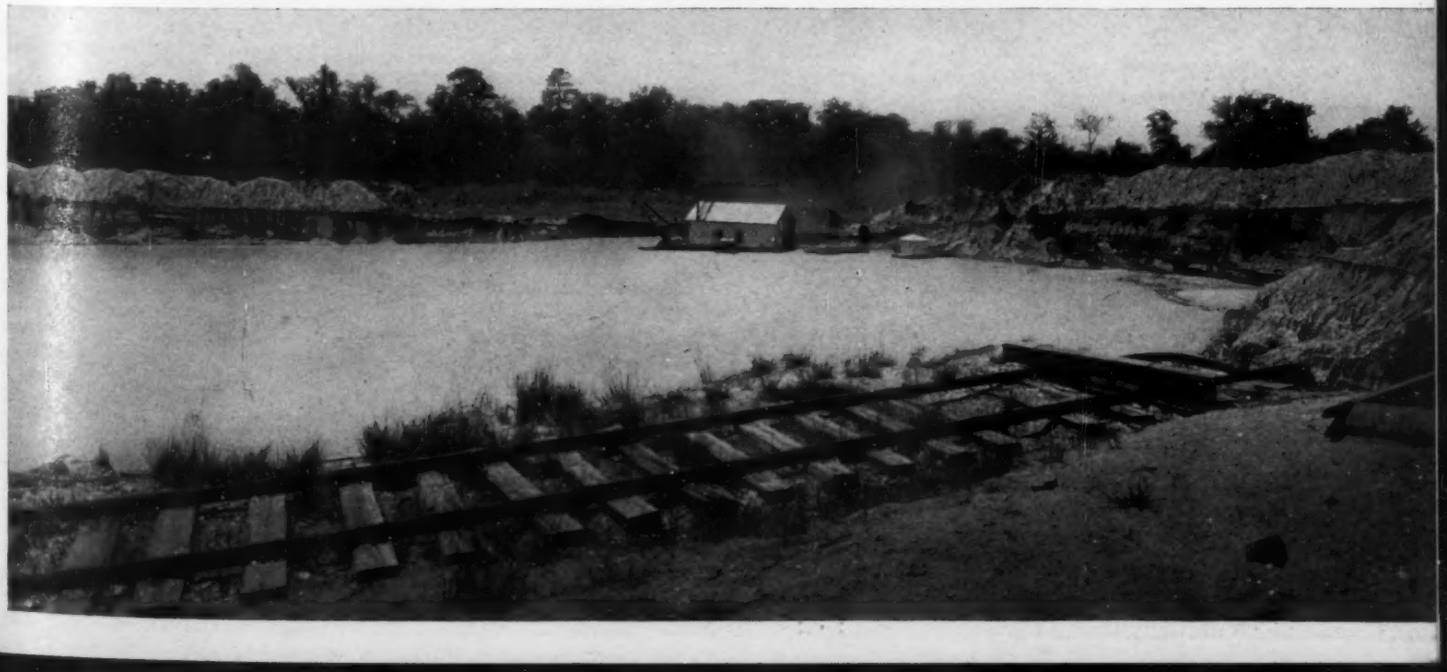
The Diesel engine consumes approximately 65 gal. of 32 deg. gravity Diesel oil in a 10-hour run. A Kohler electric lighting plant, gasoline-engine driven, is set up in the power house for emergency lighting.

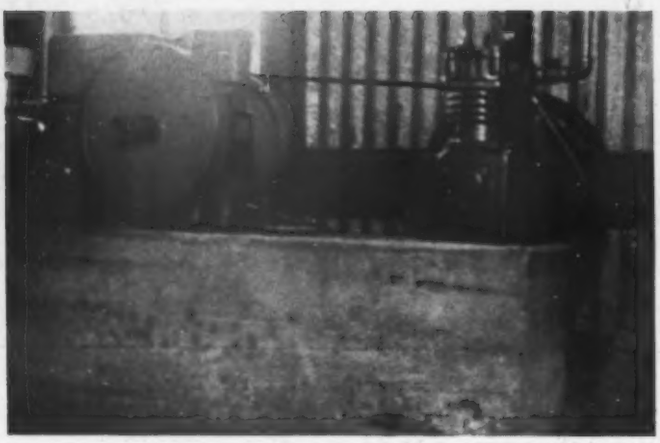
Approximately 2000 ft. of standard-gauge railroad track has been laid to the loading bins. A 45-hp. locomotive, manufactured by the Baldwin Locomotive Works, Philadelphia, Penn., is used to "spot" cars and to haul loaded cars to the track of the Rock Island Railroad. The plant is capable of processing approximately one 50-ton car of gravel per hour and a like tonnage of sand at the same time. Three 12-yd. side-dump cars are used to haul aggregate from the bins to the truck road, for loading into trucks. All railroad cars are weighed on a 200,900-lb. Fairbanks-Morse scale.

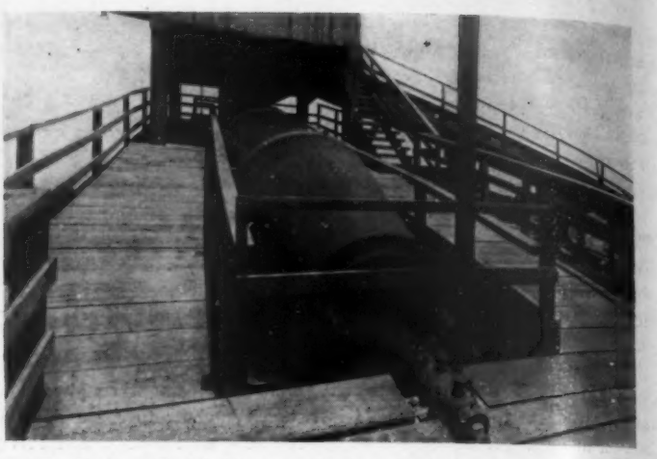
Forest Hill Plant

The *Jan*, a new all-steel dredge boat 30 ft. by 40 ft. in length, was put into operation at the Forest Hill plant. The boat is equipped with a 50-ft. W. H. K. Bennett

Gifford-Hill & Co.'s pit at Turkey Creek, La. The dredge is at a new location on the far side



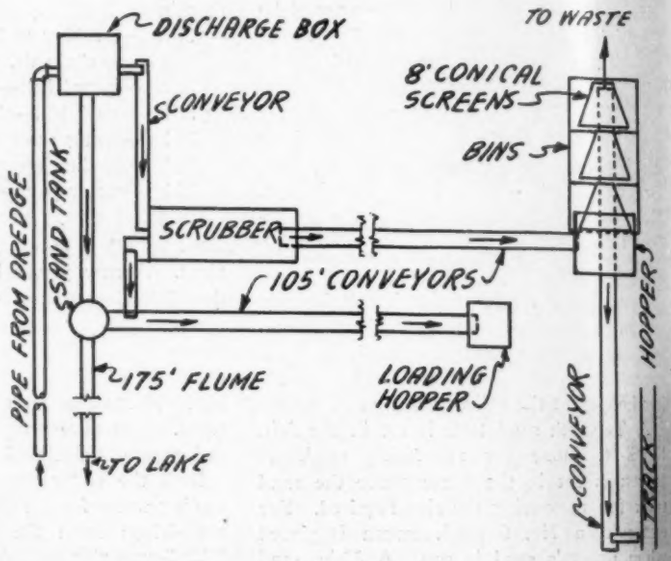




Left—Air compressor for starting Diesel engine at the Turkey Creek plant. Right—Battery of three conical screens

chain cutter and two 10,000-gal. pontoons were made from two tank cars to give the necessary buoyancy. The cutter is driven by a 25-hp. G.-E. motor through an 8-in. belt. The suction pipe is handled by a three-drum Clyde hoist driven by a 20-hp. G.-E. motor.

The boat is equipped with a 10-in. Amsco counterflow pump with a 12-in. suction and 10-in. discharge, driven by a 250-hp. direct-connected Allis-Chalmers motor at 505 r.p.m. A "bull-dozer" pump driven by a 5-hp. G.-E. motor supplies the priming water, and a 2½-in. by 2½-in. Allis-Chalmers pump unit driven by a 7½-hp. motor furnishes the water pressure required for the packing gland.



Flow sheet of the modern sand and gravel plant at Turkey Creek, La.

Sicily Island Plant

In April, 1936, Gifford-Hill and Co., Inc., took over the Sicily Island Sand and Gravel Co. plant.

This plant was first put into operation when the pit was opened five miles southwest of Sicily Island in September, 1935. Since being taken over by Gifford-Hill and Co., Inc., operations have continued and a sizable pit has been opened, with fairly steady operation.

At present, loading is being done at a point 2000 ft. from the feed hopper to the plant conveyor belt. The deposit is covered by an overburden of 1 to 15 ft. and is being excavated to a depth of 15 ft. The deposit averages 40 to 45% gravel.

Stripping is done by a ¾-cu. yd. gasoline-driven Bucyrus-Erie dragline (No. 1035). A 34-B Bucyrus-Erie Diesel-driven shovel with a 1½-yd. bucket loads the sand and gravel into trucks and a 1¼-yd. P & H 700 gasoline shovel is used for both stripping and loading.

Six Ford V-8 trucks, one International and five Hug trucks, each of 2½-cu. yd. capacity, haul the aggregate to a 15-ft. by 12-ft. field hopper at the foot of the 30-in. belt conveyor to the screening plant. The flow of aggregate to the conveyor belt is regulated by a feeder manufactured by the

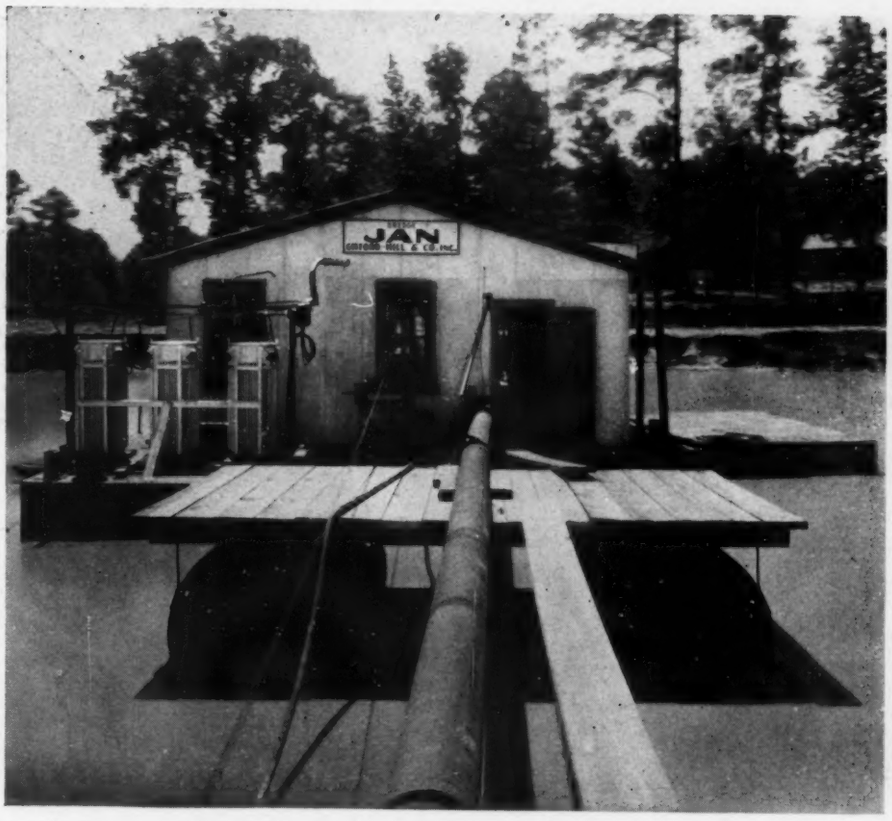
New steel dredge and 50-ft. cutter at Forest Hill, La., plant

Smith Engineering Works. A 50-hp. Westinghouse motor drives the conveyor through a 7-V belt drive. The conveyor discharges to a 5-ft. by 18-ft. scrubber, where water is added, and the material is sized over two 3x8-ft. double-deck Telsmith screens. Additional water is added here for washing.

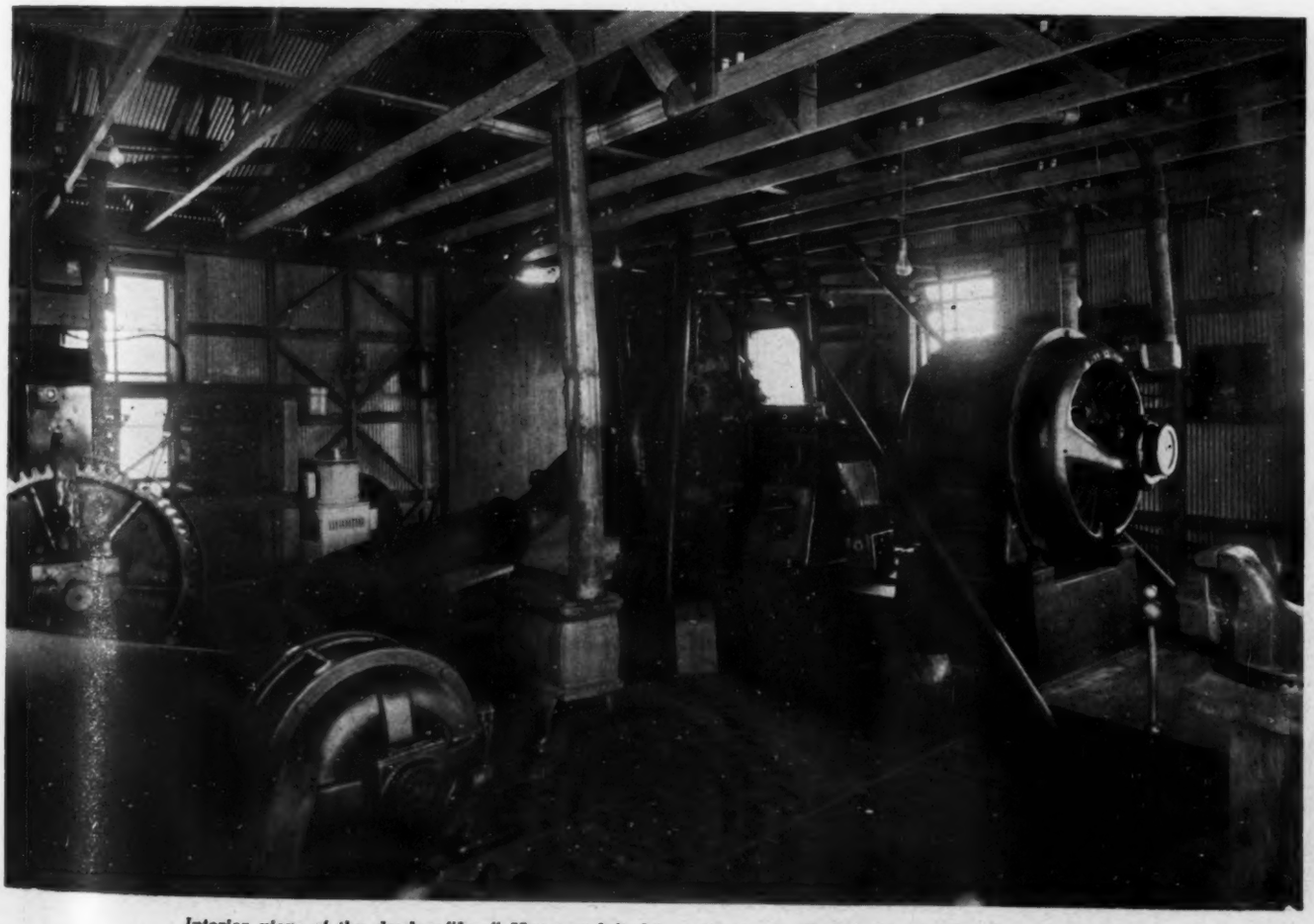
Water Supply

The plant is situated in a locality without available natural water supply, and a system of deep well pumps has been installed to pump water from a depth of 200 ft. One of them, a Layne turbine pump, manufactured by Layne and Bowler, Inc., driven by a Fairbanks-Morse line-start induction motor, was recently installed adjacent to the plant.

Water is pumped to the screens through a 6-in. pipe, and 2-in. perforated pipe over the screen decks are used for washing the aggregate. After washing, the water is returned through flumes to a settling reservoir, and, after settling, is repumped to be used over again. After sizing, the aggregate passes to four bins, each of two-car capacity. One bin is used for storage of sand, one for pea gravel, and the other two for washed sized gravel. The plant has an output of 15 cars of gravel daily, which is shipped on the Missouri and Pacific Railroad.

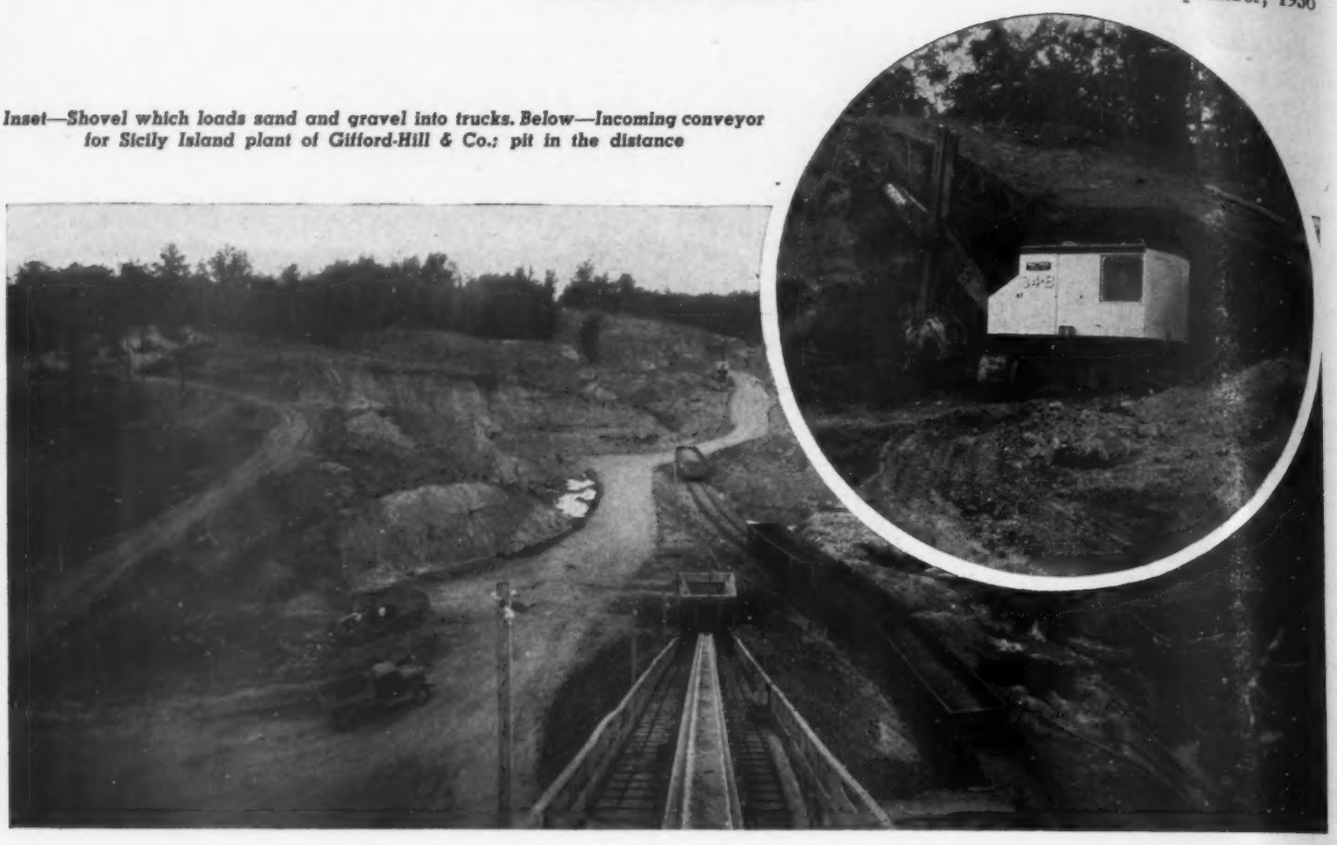


The "Jan," a new all-steel dredge boat, at Forest Hill, La.



Interior view of the dredge "Jan." Motor at left drives the cutter. Note hoist at left, pump at right

Inset—Shovel which loads sand and gravel into trucks. Below—Incoming conveyor for Sicily Island plant of Gifford-Hill & Co.; pit in the distance



General view of Gifford-Hill & Co.'s plant at Sicily Island, La.

Waste flume and lake for settling out water for re-use at Sicily Island, La.

Projected Plant

Hassinger-O'Brien Lease, Bellefonte, Penn., is the present name of the project to promote the $450,000 lime project, referred to on p. 69, August issue of ROCK PRODUCTS.

The backers of this project are H. P. Hassinger, Bellefonte, proprietor of the Oak Hall Lime and Stone Co. and M. J. O'Brien, Butler, president of the Martin J. O'Brien Co., Inc., Pittsburgh, Penn.

An unusual feature set forth in the prospectus, received by a number of Bellefonte residents during the past week, is that the organization will be a trust estate. Its capitalization consists of one class of security only, working interests in a limestone leasehold of a stated value of $100 per interest. The rights of interestholders continue as long as the lease is in effect. This security, however, has not yet been approved by the Securities and Exchange Commission.

Control and management of the trust estate and the conduct of business of the trust are vested in the trustees, subject to limitations, advice and coöperation from the executive committee, the membership of which is yet to be determined. The trustees of the Hassinger-O'Brien Lease are M. J. O'Brien, chairman and H. P. Hassinger.

The tract which is held by the Hassinger-O'Brien Lease is that known as the Watson tract in Benner township, located along the Bellefonte Central railroad.

As soon as 50% of the aggregate of 10,000 working in the interests is sold, the promoters say, the trustees and executive committee will authorize the award of contracts for the erection of a complete rotary kiln lime plant. Preliminary estimates compiled by the Martin J. O'Brien Co., and confirmed by an independent engineer of the cost of erecting a rotary kiln lime plant including a few shaft kilns and the development of the limestone mine approximate $450,000. The operation of the proposed plant with an approximate 50,000 tons of lime would require normally about 150,000 tons of raw limestone including stone required for affiliated products.

Rail Connection

Tri-State Gravel Co., Lexington, Miss., has completed a half mile of railway track to connect with the Yazoo & Mississippi Valley R.R. The new track crosses Black creek on a trestle which is built purposely low to allow trash and debris to flow over it in time of flood and thus save it from being washed out.

New Producer

Morledge and Veitch Co., Overton, Nev., is producing silica from a deposit about five miles south of Overton, near Boulder dam.

New Producer

Ready Mixed Concrete Co. of Denver (Colorado) expected to be producing September 1, with one of the most modern plants in the country. The company is a subsidiary of the J. W. Brannan Sand and Gravel Co., Denver, of which F. P. Spratlen is president. The sand and gravel company is contemplating numerous improvements.

Many Improvements

Del Monte Properties Co., Pacific Grove, Calif., a 50-year-old enterprise in the silica sand business, has recently completed improvements including a new P & H crane and 400-ft. portable belt conveyor.

The processing of the sand is briefly as follows: The sand is brought in on a belt conveyor, and passed over grizzlies to remove all large impurities, and then taken to finer screens where more minute vegetation is eradicated. From the screens, the sand is taken to concentrating tables, about 16 ft. by 6 ft., at one end of which the balance of the light vegetation and some mica are removed, and at the other end of which iron, garnet and other heavy impurities are eliminated.

From here, it is pumped by rubber line centrifugal pumps to the dewatering boxes, where excess water and other materials are removed, and then is placed in large drainage bins where the last of the moisture is taken out. From these bins, belt conveyors carry the sand through a large steam dryer, into the mica separator, and eventually into storage silos where it awaits either grinding, sacking, or bulk loading. In the course of the treatment, it is washed time and again, but a modern filtration system is available, making it possible to use the water several times.

Today, with an investment valued at $270,000, the sand plant ships out 15 different grades of materials, to all parts of the western coast, including some to Mexico, the Hawaiian Islands and the Philippines. The price of sand ranges from as low as $1.50 per ton to as high as $15 per ton, depending, of course, on the amount of refining to which it is subjected. The average monthly output is between 75 and 100 car loads.

New Plant

Denver Mortar & Materials Co., Denver, Colo., is building a new sand plant, which later will be equipped with a slackline cable excavator.

Will Build

Herbertson Sand and Gravel Co., Denver, Colo., which sold its city plant in June, 1936, to the Rio Grande Fuel Co., is said to be preparing to build a new plant elsewhere.

Will Modernize

Rio Grande Fuel Co., Denver, Colo., which purchased the Herbertson Sand and Gravel Co. plant in June will modernize and double capacity.

Buys River Barges

Dewey Portland Cement Co., Kansas City, Mo., with a plant on the Mississippi River at Davenport, Iowa, is reported to have placed an order with a Pittsburgh, Penn., concern for 12 steel barges for use in carrying coal and cement.

New Foundry Sand Plant

Piedmont Sand Co., Piedmont, Ala., has been organized by Henry Agricola, Gadsden, Ala., to produce foundry sand. B. F. Nichols, Gadsden, is in charge of plant.

Merger Planned

National Gypsum Co., Buffalo, N. Y., on August 21 disclosed plans for acquisition of Atlantic Gypsum Products Co., Boston, Mass., a concern doing an annual business of $1,000,000, marking another step in expansion program of the former. Last year National Gypsum through an exchange of stock, acquired the Universal Gypsum and Lime Co., with assets of $2,608,968.

Indication for still further expansion is seen in the fact that the company at a special meeting called August 31 asked stockholders to increase authorized class A stock by 265,000 shares although only 13,000 shares are to be used in part payment for the Atlantic properties. The undisclosed balance of payment is to be in the form of a 4% mortgage on the properties to be acquired. Based on the closing price of 53¼ on the Chicago Stock Exchange August 21, the 13,000 National class A shares had a value of $692,250.

As of December 31, 1935, National Gypsum had outstanding 208,796 class A shares of an authorized 235,000 shares.

M. H. Baker, president of the National Gypsum Co., in a letter accompanying formal notice of meeting said that with rapidly growing business National finds it necessary to enlarge manufacturing capacities in the East. Shipments from Atlantic Gypsum Products' locations will result in substantial savings for National, he said, and will put the latter company in a strong competitive position to develop the market.

Atlantic owns three plants located on deep water at Portsmouth, N. H., New York City and Chester, Penn. These plants are supplied with gypsum brought down by boat from the company's deposits in Nova Scotia. The quarries are said to be organized for large operation and through mechanical equipment, both at the quarries and plants, gypsum rock is had at comparatively low cost.

Loading sheds and bins for trucks at talc mine

Old Talc Mine Reopened

MODERN Plant Built

THE Southern Talc Co. is the name of a new company organized last summer to mine and process talc at Chatsworth, Ga. The officers are W. B. Hartsfield, president, V. C. Pickering, secretary-treasurer, and L. P. Huff, vice-president and plant manager. A new, modern plant was built and first put into operation in November, 1935.

Talc rock is mined from the same large deposit being worked by the other local companies. The deposit is located in a mountain side, extends several miles in length and has a variable depth, ranging from a few feet to several hundred. It lacks uniformity, being mixed with irregular blocks of grained talc suitable for the manufacture of crayons. The surrounding talc for grinding is mined at the same time, to be passed through the mill and marketed as a valuable byproduct.

The adit of the mine is located approximately 2½ miles from the plant, with a [illegible] mountain side leading from the bins at the mine to the main road leading to Chatsworth. The mine being worked is an old tunnel, which has been enlarged and reconditioned since its reopening. The main entrance extends horizontally a distance of approximately 300 ft. into the mountain, and a system of corridors or drifts is being worked by the room-and-pillar method without bracing or other outside support. A vertical shaft from the surface supplies the necessary ventilation.

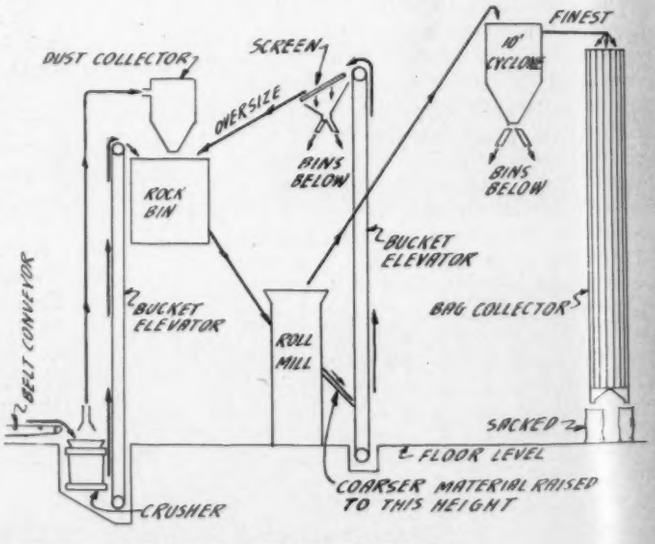
Good rock is available to a height of 250 ft. above the mine floor, which will be mined by the overhand stoping method in the near future. Ingersoll-Rand air compressors and "Jackhamers" are used for all drilling.

A 60% Trojan dynamite is used in blasting "grinding" rock and also for undermining the crayon rock. The crayon rock is undermined some 25 ft., all hard rock is removed, and the crayon rock is left hanging. Next to the hanging walls 8-ft. holes are drilled and are loaded with just enough black powder to pull the crayon rock away from the hanging wall. The crayon rock is then pulled down with iron bars, leaving the rock unshattered and in very large pieces. Dynamite is not used in crayon rock, the reason being that dynamite shatters or "slivers" it and breaks a large percentage of the crayon. The bench method is generally used in blasting, but oftentimes, because the talc runs in different shapes and irregular pitches, different methods are employed to take the best advantage of the formation.

From 40 to 50 tons of rock are mined daily and loaded by hand into small self-dump cars. The loaded cars are given a start and travel on 24-in. rails down the slight incline out of the mine and discharge into the truck-loading bins. Rock is discharged through chutes from these storage bins to the trucks. Two Chevrolet trucks haul approximately 4 tons of rock at a load to the processing plant at Chatsworth.

This plant has new, modern machinery throughout. The principal market is for

Right—Flow sheet of Southern Talc Co.



Below—Overall view of the company's new plant at Chatsworth, Ga.

Collector for dust from saws and crusher

crayons, made from the grained rock, and the pulverized material is considered a by-product. Chatsworth produces probably more pencils for use in machine shops than any other talc center in the United States.

A separate room has been built in the new plant for the cutting and shaping of crayons. Four circular saws, each operated by its own small motor, perform the necessary operations. The greatest demand is for the ½-in. by 3/16-in. by 5 in. pencil and the ¼-in. pencil.

The new structure is of galvanized iron and wood construction and consists of a 50-ft. by 120-ft. dry shed, a storage room 60 ft. by 40 ft., and the mill room which is 60 ft. by 40 ft. in plan and 5 stories high. The design of the plant and all main equipment was furnished by the Williams Impact and Pulverizer Co. of St. Louis, Mo.

Room for storing raw material

Rock is hauled from the mine bins and the trucks are weighed as they enter the storage shed before dumping. This room has a capacity of approximately 600 tons of rock. The rock is dumped on either side of a 14-in. Link-Belt, belt conveyor, 40-ft. centers, which is fed by hand. This conveyor is driven by a 3-hp. G.-E. motor and carries rock to the crusher. The crusher is a Junior Williams hammer mill, driven by a 25-hp. G.-E. motor. It is set below the main floor level and is fed by gravity from the conveyor above. Approximately 10 tons per hour is crushed to ½-in. minus by this crusher. A Link-Belt bucket elevator, driven by a 5-hp. motor on 49-ft. centers, carries the rock to a 50-ton rock bin located above the Williams roll mill. The crushed rock passes by gravity through a steel chute and is discharged through an electric automatic feeder to the Williams PW 106 4-roll mill, which is driven by a 50-hp. G.-E. motor. The mill is set by hand controls above for whatever mesh talc is to be run. Air is supplied by way of a 24-in. pipe from the Clarage fan located at the top of the plant. The fan has 28-in. blades and is driven by a 40-hp. G.-E. motor through a V-belt drive.

Top floor of the plant, showing fan and motor

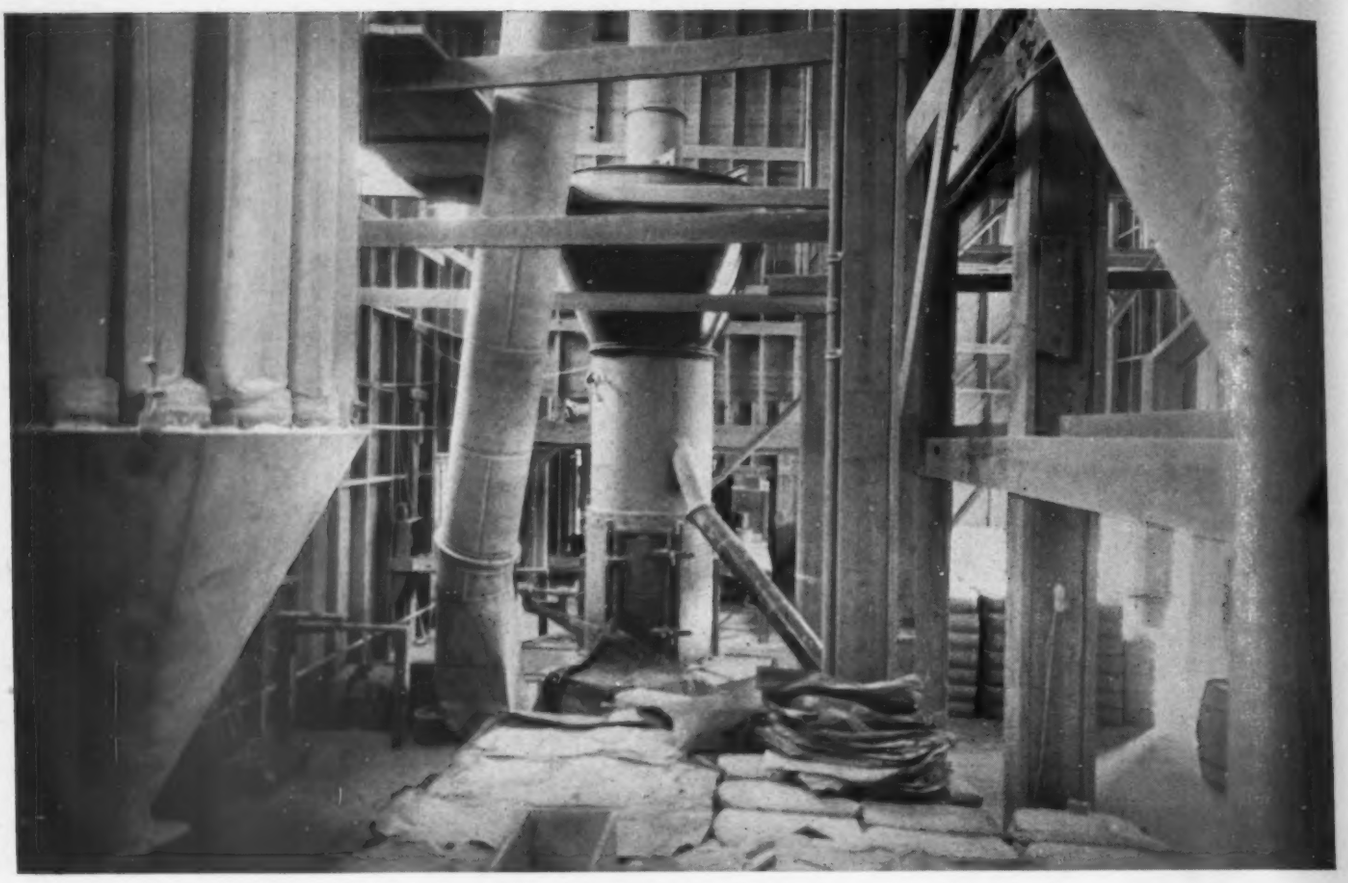
325-Mesh Talc

The finest talc run is one of which 99% passes a 325-mesh sieve. Whatever size is being run passes through a 24-in. pipe to a 10-ft. cyclone near the top of the plant. This cyclone discharges to either one of two 30-ton bins directly below and is sacked from these bins. A saddle connection is made to these bins, so that a hand gate is operated to release the talc to one bin or the other at will. The mill is a closed circuit mill in every respect. The lightest material, which does not settle in the 9-ft. cyclone, passes to a bag dust collector 30-ft. high, having about 24 bags. Approximately ¾ ton of this light material is collected in sacks per day, probably being better than 400-mesh.

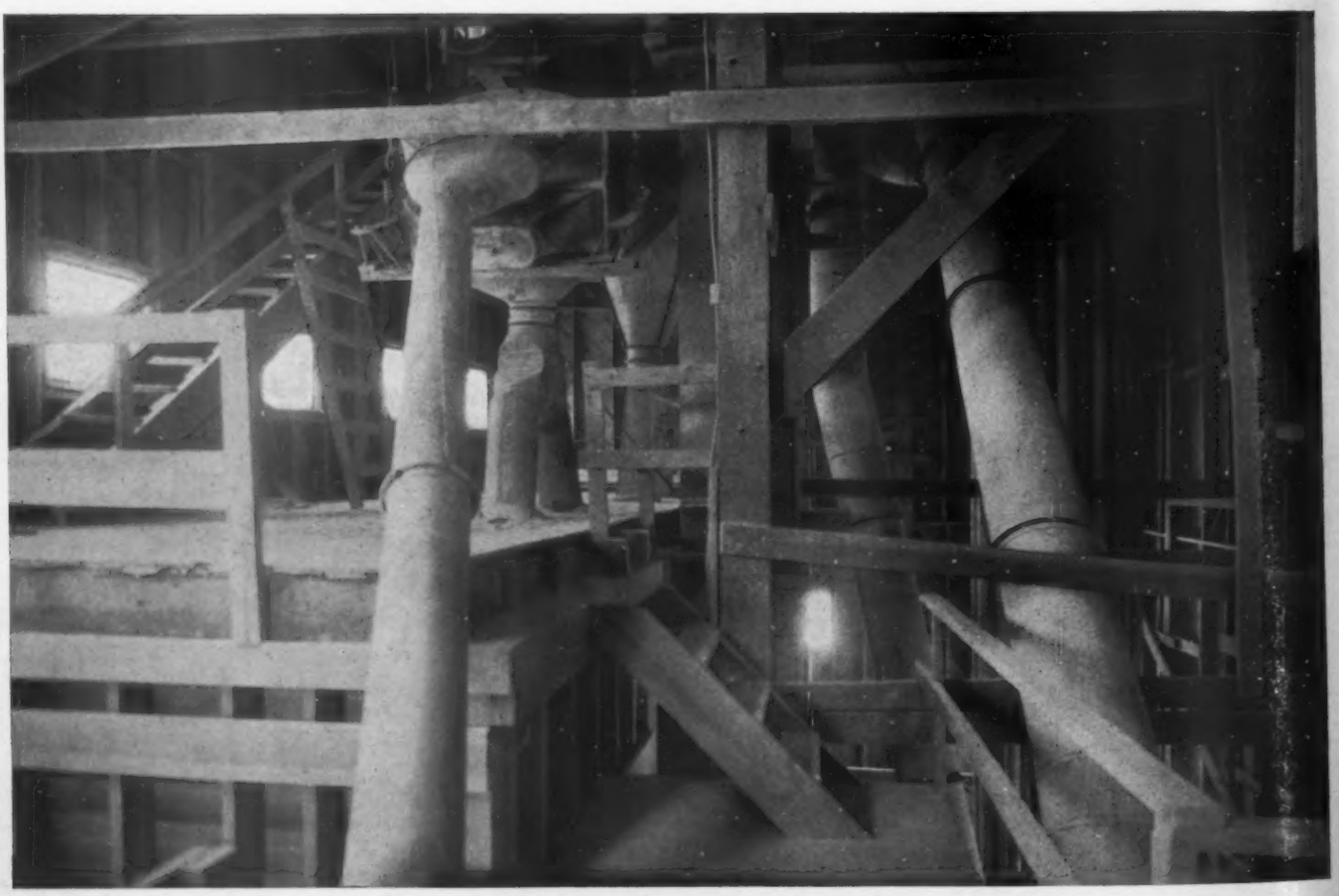
The grinding mill installation at Southern Talc Co.

Granular Talc

When material of a certain fineness is being run, heavier particles are raised and fall through a 10-in. pipe to a 60-ft. cen-



Close-up of mill at Chatsworth plant. Bag collector is at left



Screens for sizing "granular" talc. Pipe on left carries oversize back to rock bin

ters, Link-Belt bucket elevator. When 200-mesh talc is being made, material from 40 to 200 mesh is raised and dropped into this elevator. Such a "granular" product contains a trace of No. 40 screen, approximately 10% No. 60 screen, from 12% to 14% No. 80 screen and approximately 40% No. 100 screen material.

The elevator discharges to a 10-ft. by 4-ft. double-deck Williams, enclosed screen, where the proper sized granular material is separated out. Only the upper deck of this screen is being used at the present time. Material going through the 35-mesh screen can be passed by gravity to either of two 30-ton bins below, through a saddle connection. Oversize passes by gravity through an 8-in. pipe back to the rock bin to go through the mill again with fresh rock.

Dust Collector

A smaller cyclone dust collector manufactured by the Chattanooga Blowpipe and Roofing Co., Chattanooga, Tenn., with an 18-in. fan driven by a 5-hp. motor, collects the dust from the crusher and the saw department. Dust from the crusher is collected through a 10-in. pipe and each of the 4 circular saws has a hood surrounding it and dust goes to the same collector. The cyclone is set just above the rock bin and discharges by gravity to it. The capacity of the plant when running 98% through a 200-mesh sieve and with granular talc is 50 tons per day. The plant has a five-car siding on the L. and N. Railroad.

Tennessee Rock Phosphate

Columbia, Tenn.: Shipments of phosphate so increased in late July and early August as to create an incipient local car shortage, but it was quickly relieved. Ordinary and specially manufactured product for furnace use is going out in large amount to furnaces at Rockdale and Nashville, Tenn., and Muscle Shoals and Anniston, Ala., while blast furnaces in the North and East are taking occasional supplies.

Run of plant shipments for the regular fertilizer manufacturing trade are moving in good volume under routine withdrawals against contracts, while shipments to farmers of ground phosphate rock for direct application to Oklahoma, Kentucky and Southern Illinois have started out a few weeks earlier than is usually the case and in larger volume than for many years past. Inquiry from Ohio, Indiana, Michigan, Wisconsin, Iowa and Missouri all indicate much more interest in this source of phosphorus than heretofore manifested, and shipments to the northern half of Illinois, where the great bulk of this product has been used for the past 35 years, give evidence of reaching almost the old time normal volume.

It is hard to conceive how great this branch of the business would become, if it only had the encouragement of the fertilizer industry, control officials and experiment stations generally, TVA and other government agencies, instead of the active opposition of most of them. Even with the effort of these bodies to confine soil conservation programs to superphosphate, it is impossible to keep thinking farmers from realizing that, in a phosphating program designed for many years' benefit, it is uneconomical to pay $1.50 per unit for phosphoric acid to get it available in thirty seconds, when for 50c per unit or less it can be had in ground phosphate rock available in ample time for all needs.

Hand mining is in active progress, all the plants are running with fair regularity. Monsanto's simply enormous plant, unapproached in size and pretentious appearance by anything ever heretofore erected in this field is rapidly taking shape for better guessing by the uniformed outsider as to what it may be intended to do. TVA continues to buy another piece of property every few days and to be reported to be deciding in what part of the phosphate field their furnaces for cheap production of phosphoric acid will be located, while a veritable army of construction gangs and linemen are building the transmission lines from Pickwick, Wilson and Wheeler dams to the substation of huge proportions being erected at Krauses Crossing on the L. & N. north of Godwin station.

While some of the old hand miners and TVA contractors still have a few laborers working at the old starvation wages of $3.50 a week, employment is increasing so that fewer of these are obtainable each day.

Use for Syenite

Drs. Chas. A. and John H. Koenig, brothers, working at the Ohio State University research laboratories, are said to have discovered that syenite, a rock closely allied to granite, is a satisfactory substitute for feldspar in the pottery industry.

Consolidation

Pennsylvania Glass Sand Corp., Lewiston, Penn., has acquired the plants and properties of the **Tavern Rock Sand Co.,** subsidiary of the Owens-Illinois Glass Co. in Klondike, Mo., Millville, N. J., and Enterprise, Kan. It is understood that the deal includes supplying the glass company's sand requirements. This makes the Pennsylvania Glass Sand Corp. probably the largest producer and refiner of silica sand in the world.

The New York Stock Exchange has authorized listing an additional 13,775 shares of the common stock of the company, bringing the total listing to 450,000 shares. It is reported between 15,000 and 15,429 shares was the price paid for the Tavern Rock Sand Co. At present quotations this is approximately $334,000.

Barytes Plant

Industrial Minerals Corp. of America, Buffalo, N. Y., has leased former plant of Chinn Mineral Milling Co., near Harrodsburg, Ky., and will remodel for barytes mining and milling plant, including installation of crushing, grinding and other machinery.

Expansion

North Bangor Slate Co., Bangor, Penn., has purchased the real estate, machinery and equipment of the Bangor Union Slate Co., formerly operated by the Auld and Conger Co., and also the real estate, machinery and equipment of the Bangor Excelsior Slate Co., formerly controlled by the Genuine Bangor Slate Co. and Robert S. Brown.

This is regarded as the largest transaction in slate property that has taken place in this region in years, and will increase materially the production of the region.

William H. Smith, of Bangor, commenting on the deal, said that a number of technical details are still to be completed before physical possession of the property is taken.

It is planned to operate the Bangor Union quarry, which immediately adjoins the present operating quarry of the North Bangor Slate Co., as soon as the transaction is completed. It will be run in conjunction with the North Bangor quarry, and when the work is started, employment will be provided for about 50 more men. Work already is under way on the construction of two new cableways that will be necessary to handle the output of the combined quarries.

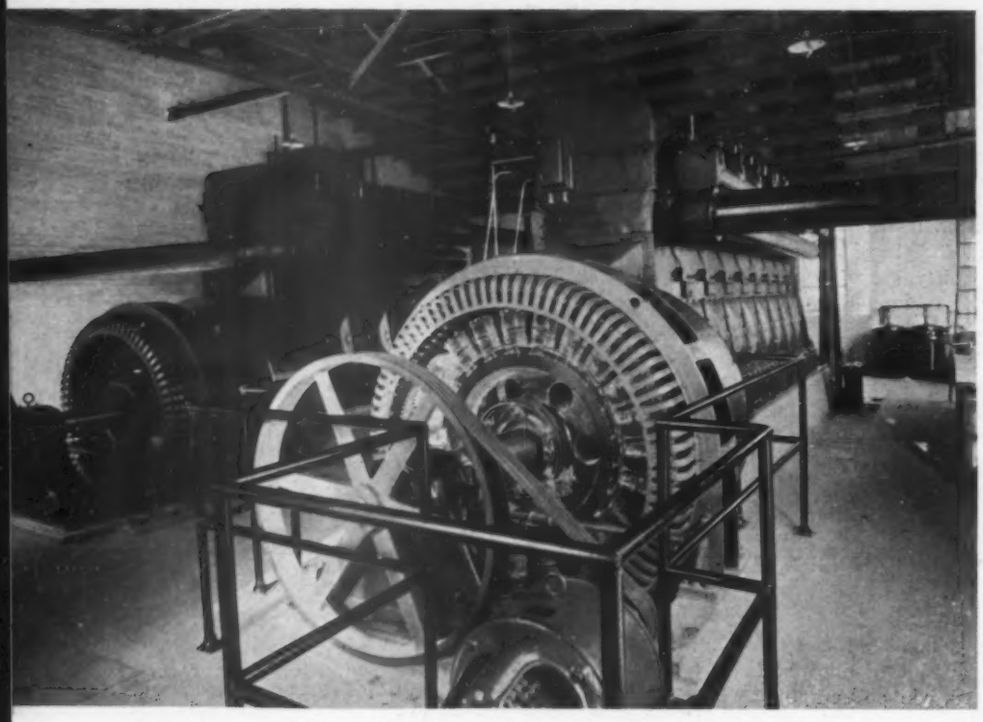
Increased demand for slate has resulted in the best increase in the slate business in this territory in many years, and has been responsible for the opening of a number of quarries that had been closed for several years. One of these is the Bangor Vein quarry, where operations were resumed after it had been shut down for four years. This property is now being operated by the Ditchett estate, Joseph Trayes, William H. Smith and Son, Charles A. Smith, and employs 45 men.

The United States quarry in the Pen Argyl district has been reopened and it is believed that with a continued increase in the demand, as anticipated, other quarries, some of them long idle, will start operations.

In general, inventories are low, and the quarries are having all they can do to keep pace with the demand.

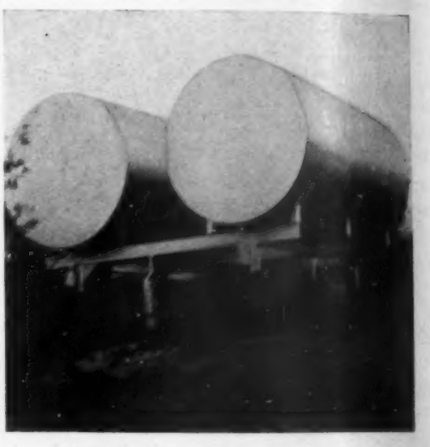
Reorganizing

Marianna Lime Products Co., Marianna, Fla., has a petition pending for reorganization under the Federal Bankruptcy act.



The two Diesel engines which furnish all plant power

MAKES *own* ELECTRIC POWER



Two 12,000-gal. oil storage tanks

POWER COSTS have been reduced considerably at the plant of the Ste. Genevieve Lime and Quarry Co., Ste. Genevieve, Mo., manufacturers of high grade quick lime and hydrate, since the installation of two large Diesel engines and alternating current generators this spring, to provide the necessary electrical energy to drive all plant motors. The company was incorporated and started doing business in 1902. Originally the plant was operated by company-generated steam power and some purchased electrical power. For the past 5 or 6 years, all power has been purchased from the utilities company, up to the time of the installation of the Diesel engines this spring. Company officials say that savings of $700-$800 per month, as compared to the cost of purchased power, have resulted.

All equipment in the power house is of new, modern design. Ground was broken for the foundations on October 7, 1935, and 25 days were required for digging and finishing the foundations for the power plant and fuel tanks. The first Diesel engine was in place on January 31, 1936, and was first put in operation under plant load on February 24. This engine is a type VDSB Diesel manufactured by the National Superior Co., Springfield, Ohio, and having a power rating sufficient for supplying all plant motors when all are in operation. The Diesel engine has 8 cylinders, a 14½ in. bore and 18 in. stroke, and develops 750 hp. at 327 r.p.m.

Switch and panel board for control of the two Diesel engines

Direct connected to this engine, with the shaft revolving in a Westinghouse bearing, is the Allis-Chalmers alternating generator, with a rating of 2300 volts, 150 amperes and 625 kv.a. A 15-kw., 125-volt Allis-Chalmers exciter is driven by the shaft through a V-belt drive at 1750 r.p.m.

On May 25, a 375-hp., 4-cylinder Diesel engine, of the same type, also manufactured by the National Superior Co., was put into operation. This engine was installed for the purpose of relieving the larger engine—for night operation and on Sundays when the load is light. This engine has the same bore and stroke as the larger

Ste. Genevieve Lime and Quarry Co. Installs Diesel Engines

●

one, and is direct-connected to a 312 kv.a., 2300-volt Allis-Chalmers alternating generator. A 125-volt, 12-kv.a. Allis-Chalmers excitor is driven off the main shaft through a V-belt drive.

The Diesel engines and all accessory equipment are housed in a building 34 by 48 ft. in plan, with 12 ft. eaves. Cooling water is supplied from one Marley cooling system and basin, adjacent to the power house. The basin is 14 by 22 ft. in plan and 4½ ft. deep. Water is pumped from the basin to the Diesel engine cooling systems by either one of two 3-in. Deming pumps, which together have a capacity of 300 g.p.m. Only one pump is necessary to supply the needed water, and the other is ready for emergency duty. Each pump is driven at 1725 r.p.m. by a 7½-hp Robbins and Meyers direct-connected motor.

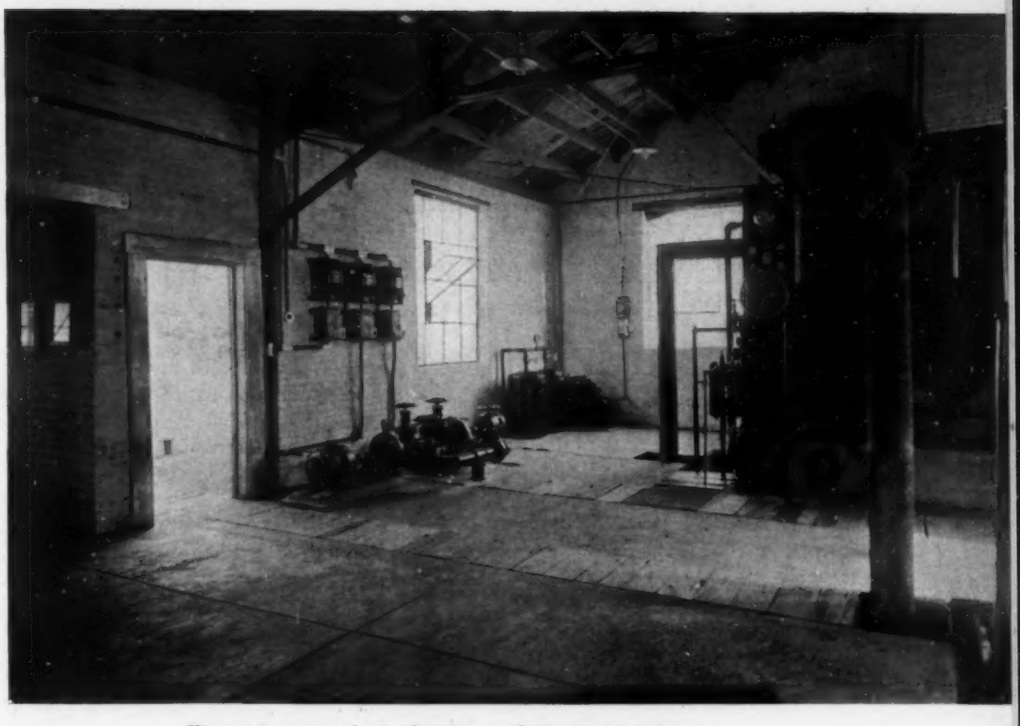
Twenty sprays cool the returning water, as it passes over the cooling tower, from 120 to 90 deg. Fahrenheit. The average water temperature in the basin is about 110 deg. Air for combustion for both engines is furnished by a fan air filter manufactured by the Coppus Engineering Corp., Worcester, Mass., through 10-in. pipe. Each engine exhausts to the air through an 8-in. pipe.

A model W 4½x4½—3x4½ two-stage air compressor is driven by a 5-hp. Robbins and Meyers motor to supply the air at 240 lb. sq. in. necessary to start the Diesel engines.

An Allis-Chalmers control board was installed with two generating panels and one for distribution. The board is equipped with Condit oil circuit breakers, rocker-type Allis-Chalmers voltage regulators and Westinghouse watt-hour meters, ammeters, voltmeters and kilowatt meters.

Fuel

Shell "Dieseline," manufactured by the Shell Petroleum Corp., is the fuel used. Two 12,000-gal. storage tanks were installed on a hillside approximately 150 ft. from the power house. Oil passes by gravity from these tanks to the day tank at the power house, where it is "picked up" by the Diesel oil pumps. Lubricating oil for the Diesel engines passes through oil filters, manufactured by Wm. W. Nugent and Co., Chicago, Ill., after which it is re-used. Two of these filters are used with the larger of the two engines and one with the smaller.



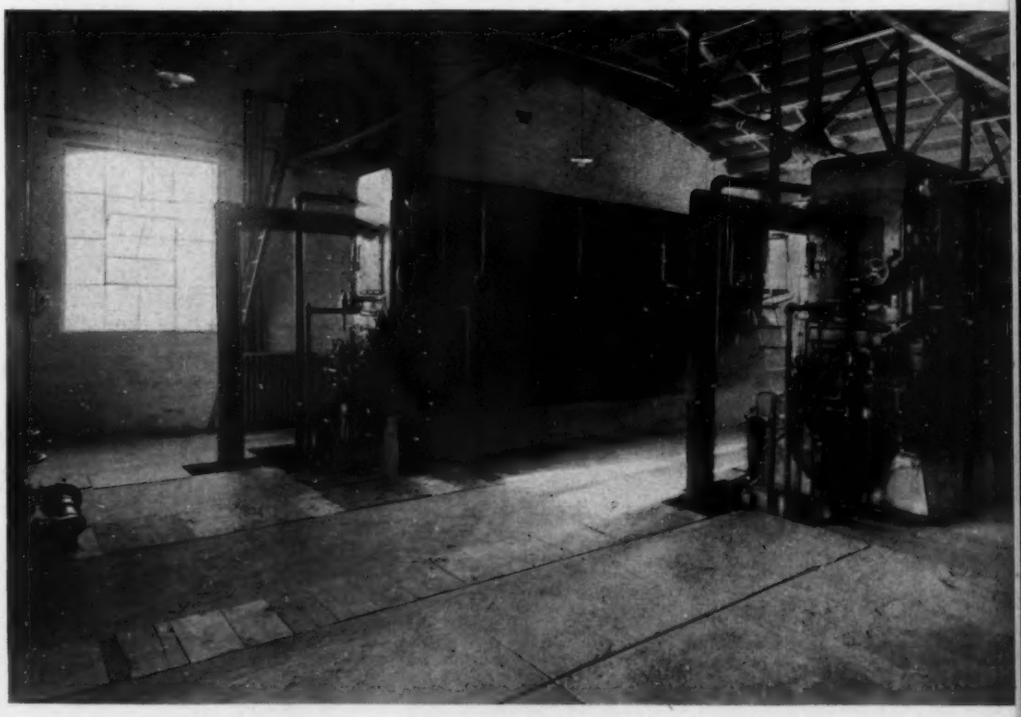
View in power plant, showing cooling-water pumps

Power Requirements

In full day-time operation, motors used in the kiln room and for the gas producers and fans, in the lime handling department and in the quarry all are operating, with the 8-cylinder Diesel engine and alternator supplying the required energy. If necessary, the large Diesel engine can develop 810 hp. at 360 r.p.m.

A number of motors are not in operation at night and on Sundays, when the 4-cylinder Diesel engine is pressed into service in place of the larger one. The large Diesel engine operates 10 hr. daily, with the smaller one in operation the other 14 hr.

Officers of the company are C. H. Kammann, president and treasurer and Karl P. Kammann, vice-president and secretary. Eugene Pracht is superintendent and Henry Byrd serves as master mechanic.



Another view of the two Diesel engines

Snapshots of celebrants at trophy dedication ceremonies, Marblehead Lime Co., South Chicago, Ill.

Lime Association Safety Trophies Dedicated

National Lime Association during the week of August 3 initiated a series of plant safety meetings, at which certificates of honor were awarded those plants which went through 1935 without lost-time accidents—nine out of 304. Similar meetings will be held from time to time at other plants, as part of the safety campaign of the industry, conducted under the auspices of the U. S. Bureau of Mines.

The first of these meetings was held at the Galloway, Mo., plant of the Ash Grove Lime and Portland Cement Co. on August 4. Paul Hatmaker, National Lime Association, and A. U. Miller, U. S. Bureau of Mines, Washington, D. C., made addresses. On the same afternoon a picnic meeting was held at the Springfield, Mo., plant of the Marblehead Lime Co. This plant won not only a National Lime Association certificate but the company's inter-plant contest trophy. On August 5, the Quincy, Ill., plant of the Marblehead Lime Co. was the scene of a similar meeting.

The most interesting meeting was held August 7 at the South Chicago, Ill., plant of the Marblehead Lime Co., where the principal speaker was Bernard L. McNulty, president of the company. This celebration included a flag raising and a parade and music by the South Chicago Legion Junior drum and bugle corps, which subsequently won first prize in a contest at the Chicago stadium.

Several visitors were invited and these had an opportunity to inspect the rotary kiln lime plant and the S. S. *W. F. White*, a 9000-ton self-unloader lake carrier, which was discharging limestone at the plant, from the Michigan Limestone and Chemical Co., Rogers City, Mich.

Too Many

Fatal accidents in quarries and gravel pits were unusually and unnecessarily frequent during the past month. Our news reports are probably not complete, yet there are records of the deaths of nine men in August. Four men, in widely scattered sections of the country, were killed by cave-ins in gravel pits. Two men at different quarries were killed in blasting accidents. Two were killed in different plants in falls, one of them falling into a crusher. One died of heat.

Promotions

General Crushed Stone Co., Easton, Penn., has promoted Meredith Bovee, formerly superintendent at the Leroy, N. Y., plant, to be general superintendent of the company's Division Number 1. This division consists of all plants in Pennsylvania and Massachusetts. Mr. Bovee's appointment became effective on August 5 and his headquarters are in the company's general offices at Easton. Donald Hawthorn, formerly superintendent at the Akron, N. Y., plant, succeeds Mr. Bovee at Leroy.

Prison Wins Trophy

Folsom State Prison quarry, Folsom, Calif., won the U. S. Bureau of Mines safety contest for open-pit mines and quarries in 1935. The bronze trophy, "Sentinels of Safety," is awarded annually by the *Explosives Engineer*. The operating time for this quarry was 717,168 man-hours, or 259 days, and no disabling accident occurred during the year.

Silica Project

Gladding, McBean & Co., Los Angeles, Calif., are said to be prospecting near Barstow, Calif., for a deposit of silica suitable for the manufacture of refractories.

Just Off the Press

The Minerals Yearbook, 1936, has been released by the U. S. Bureau of Mines. Giving comprehensive data of the country's developments in the metallic and non-metallic fields in 1935, the book is obtainable from the Superintendent of Documents, Washington, D. C., for $2.

New Company

Asphaltic Limestone Co., Columbus, Ohio, has been organized with T. D. Van Camp, president, as selling agent for the Ohio Rock Asphalt Co., New Vienna. Other officers connected with the new company are F. L. Ferguson of Wilmington, Ohio, vice-president, and George W. Van Camp, Columbus, secretary and treasurer.

Left—Parade at safety ceremonies at lime plant, South Chicago. Right—A view of the plant

Cement Shipments

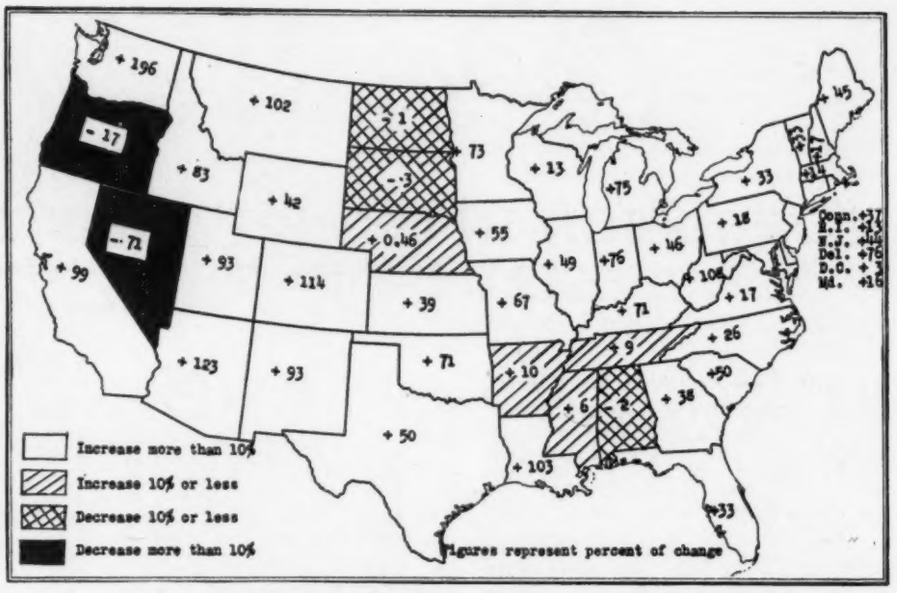
Portland cement shipments for the first six months of 1936 were 46,561,662 bbl. compared with 31,706,494 bbl. for the same period last year. The accompanying map and table compiled by the U. S. Bureau of Mines shows where the increase has occurred.

PORTLAND CEMENT SHIPPED FROM MILLS INTO STATES IN FIRST SIX MONTHS OF 1935 AND 1936, IN BARRELS

Shipped to—	First six months 1935	1936
Alabama	578,825	569,718
Alaska	10,914	10,601
Arizona	129,066	288,209
Arkansas	254,990	279,830
California	2,838,590	5,658,330
Colorado	251,776	539,632
Connecticut	327,150	448,078
Delaware	89,055	157,059
Dist. of Columbia	375,523	385,489
Florida	391,252	520,982
Georgia	505,822	700,563
Hawaii	147,569	131,053
Idaho	86,889	159,334
Illinois	1,825,887	2,722,068
Indiana	825,564	1,449,267
Iowa	802,954	1,244,471
Kansas	691,590	964,319
Kentucky	381,163	651,820
Louisiana	389,705	789,977
Maine	89,110	128,977
Maryland	473,509	547,909
Massachusetts	686,435	779,518
Michigan	1,168,567	2,042,294
Minnesota	656,167	1,137,357
Mississippi	256,106	271,892
Missouri	776,356	1,292,696
Montana	289,924	585,503
Nebraska	460,158	462,253
Nevada	394,076	113,175
New Hampshire	106,701	125,129
New Jersey	982,542	1,418,934
New Mexico	136,910	264,090
New York	3,201,412	4,245,950
North Carolina	414,780	520,702
North Dakota	127,426	126,288
Ohio	1,517,221	2,218,177
Oklahoma	682,155	1,164,190
Oregon	477,477	395,416
Pennsylvania	1,925,305	2,274,113
Puerto Rico	90,912	88,686
Rhode Island	179,919	203,763
South Carolina	171,485	257,567
South Dakota	191,691	185,508
Tennessee	915,494	1,001,590
Texas	1,815,031	2,722,593
Utah	126,523	244,753
Vermont	68,506	90,810
Virginia	576,627	1,463,872
West Virginia	402,460	835,426
Wisconsin	794,560	897,964
Wyoming	69,110	98,115
Unspecified	82,842	8,801
	31,706,494	46,561,662
Foreign countries	226,506	248,338
Total shipped from cement plants	31,933,000	46,810,000

Cement Plant Activity

South Africa: The South African cement shortage, caused mainly by the building boom in Johannesburg, has been remedied by expanding domestic production so that imports from overseas will not be needed. A new plant has been established by the Pretoria Portland Cement Co. at Jupiter within the Johannesburg municipal area; another at Roodepoort, 12 miles from Johannesburg, by a new company, the Anglovaal Portland Cement Co., Ltd. Both plants are already in production and a third is being constructed at Henneman, in the Orange Free State, for the Atlas Cement Co. of South Africa, Ltd. The Cape Port Cement Co. plant at De Hoek, 104 miles from Capetown, is being enlarged.



Map showing increase in cement shipments for first half of 1936

Optimist

E. J. Mehren, president, Portland Cement Association, in an interview with Associated Press reporters in New York City, August 18, is quoted as saying that states, counties and cities, had appropriated 113% more money, exclusive of help from the Federal Government, for construction in the first half of this year than for the like period of 1935. He added:

"This is particularly important, because it gives promise that expenditures of their own funds by subordinate political jurisdictions next year may more than make up for the expected shrinkage in Federal public works construction."

The 166 plants of the 91 portland cement companies in the United States, Mr. Mehren predicted, will ship more than 100,000,000 bbl. this year, for the first time since 1931. Shipments in 1935 were less than 75,000,000 bbl. and in 1934 were under 65,000,000.

Cement shipments this year, said Mr. Mehren, will exceed by at least 10,000,000 bbl. the estimates made at the beginning of the season.

Trade circles calculate the building of streets, sidewalks and highways accounts for more than 25% of all cement sold. Awards for that type of work in the first seven months of this year exceeded those for the like 1935 period by about 60%, Mr. Mehren said.

Indicating gains in almost all classes of construction, Mr. Mehren estimated, "residential building will probably show an increase of 80% over 1935."

He looks for a 62% improvement in the volume of commercial building. Factory construction, included in the commercial classification, is showing the widest gain and at the present rate should close 1936 roughly 90% ahead of last year, he thinks.

To Move Offices

Monolith Portland Cement Co., Los Angeles, Calif., is planning to move its general offices to the plant site at Tehachapi, according to local report.

Long-Distance Shipment

Dewey Portland Cement Co., Dewey, Okla., plant recently filled an order for 1000 bbl. of its special oil-well cement for shipment to the Isle of Bahrein in the Gulf of Persia, via New York. The Standard Oil Co. of California is developing oil wells there.

Resumes Production

Lehigh Portland Cement Co. has resumed production at its Mitchell, Ind., plant after a shutdown since May 29. W. H. Weitknecht is superintendent. It is said that an attempt will be made to keep the plant in steady production on a part capacity basis rather than intermittant operation on a larger capacity basis.

Prospecting Cement Materials

Macon, Miss.: C. E. Caron and two other business men are reported to have been prospecting for cement raw materials, with the idea of establishing a plant near here. C. E. Caron, according to the most recent directory of the cement industry, is works manager of the Trinity Portland Cement Co., Dallas, Tex., of which John L. Senior, Chicago, Ill., is president.

Distribution Facilities

Alpha Portland Cement Co. is building on one-story concrete, concrete block and steel building for storage and distribution at 2600 New York Ave., N.E., Washington, D. C.

Chemists' Corner

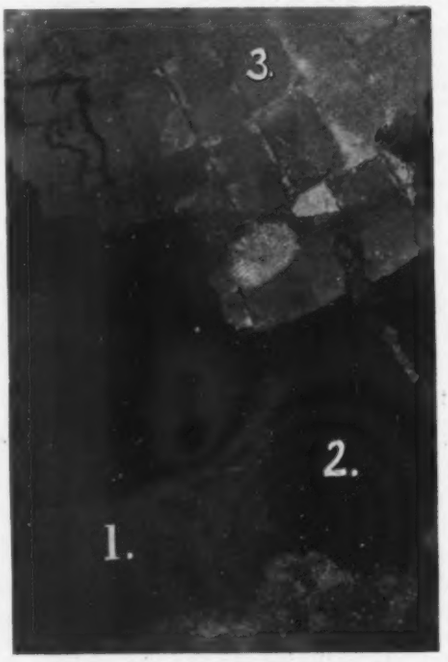
CORROSION IN CEMENT KILN PRODUCED BY SPECIAL INSULATING MATERIAL

(Contributed)

REPORTS were received from P. Palomar, manager of the Asland Cement plant at Moncada, near Barcelona, Spain, some time ago, of a rather strange phenomenon that was discovered along the inside of the shell of a dry-process cement kiln, which proves that it is very important to investigate every factor and study every angle that enters into the application of new developments, which, although successful in other fields, may not be quite applicable to the cement industry.

This happened when a certain insulating product that had given excellent results in coal saving in other industries was applied to a cement kiln. This material is highly heat resisting and is in a way similar to diatomaceous earth, being very high in silica, known by the German name of "Kieselguhr." This material is sold in the form of bricks which are applied as an insulating element in boiler walls, flues, etc., with excellent results. Naturally, because of the great importance of diminishing losses of heat by radiation in rotary cement kilns, the idea came to use this insulating block between the refractory brick and the shell of the kiln in the form of circular rings. The result obtained from the point of view of decreasing the losses by radiation were extremely satisfactory and to all appearances the experiment was quite successful.

The Asland plant had applied this material to a rotary kiln about 10 ft. in diameter by 165 ft. long, which, as has already been said, was a dry-process kiln. Several times the refractory had been changed on the zone closer to the firing end but nothing abnormal was discovered in the shell. Some time later, however, it was necessary to make repairs in the zone of the kiln corresponding to the tire closer to the feed end of the kiln, and upon removing the refractory and the insulating material in order to get at the shell proper, it was found that between the insulating material and the plate of the kiln there was a great quantity of extremely fine red powder. Upon analysis this proved to be red iron oxide. At the same time the plate was found to be extremely oxidized.



The plate of the shell after removing the lining. Region 1 shows plate after scraping; 2, coating of iron oxide; 3, remains of the insulating material

It was difficult to explain the reason for this great corrosion, because although it was true that the insulating material had been rather damp when placed, having been exposed to the weather for some time, it was hard to believe that this dampness would be sufficient, even in the face of the high temperature, to produce the extreme oxidation after eight years of continuous operation of the kiln.

In view of the importance of this discovery, and in order to have more elements to study, the entire lining was torn out and it was discovered that the condition was general throughout the entire zone where the insulating material had been applied under the refractory. The oxidation increased towards the feed end of the kiln and decreased towards the firing end, there being absolutely no corrosion in the zone nearest the firing end, at which point the refractory had been applied directly to the shell without the use of insulating material in between.

The result of this inspection showed that undoubtedly the insulating material was causing the oxidation of the plate to this great extent. It was found that in places, especially around the rivet heads, the depth of the corrosion was as much as 160 thousandths of an inch, having a similar appear-

Scale removed from the kiln between the refractory and the plate

Scales of iron oxide found between the insulation and the plate

ance as can be observed in the oxidation of a steam boiler.

It was more difficult, however, to decide just what produced this attack, as the insulating material was chemically inactive. It was not a case of high temperature only, as in the zones where the temperature was higher, the corrosion was less than in the zones of lower temperature. As this was a dry process kiln, it was not possible to assume that the moisture of the raw material was the cause of the reaction, and as this kiln had worked very regularly during the previous years, and at times had worked 330 days per year without important shut-downs, it was necessary to discard the hypothesis that extreme changes of temperature would cause the trouble.

Catalytic Effect

Finally the following solution was suggested:

Among the catalysts which can be used in the contact process of obtaining sulphuric acid from sulphur gases are the oxides of iron and silica, when operating at high temperatures; that is, temperatures above 450 deg. C. It is presumed that a small quantity of iron oxide was formed initially on the plate of the kiln due to the action of the moisture that the insulating material had at the time it was placed in the kiln; and this insulating material, very high in silica, could have acted as a catalyst, transforming the sulphurous anhydride resulting from the gases of combustion of coal, into sulphuric anhydride, which reacted with the water evaporated from the raw material in the zone of high temperature of the kiln to form sulphuric acid. The sulphuric acid would attack the iron shell, producing iron sulphate, which was actually found when analyzing the scale of dark red material sticking to the insulating bricks.

It is well known that the sulphate of iron is broken down by the action of heat, yielding sulphuric anhydride and leaving as a residue the powder of red oxide that was found in such abundance next to the plate of the shell. This cycle is repeated indefinitely because of the new contribution of SO_2 which came from the gases of the kiln.

This action must have been very strong because the coal used in this particular kiln contained only 0.8 to 1.2% of sulphur.

The fact that there was no corrosion in the zone of the kiln where no insulating material was used, and on the other hand the corrosion increased towards the feed end of the kiln, seems to confirm this theory, as it is well known that the refractory is much cleaner towards the feed end of the kiln and this would make it possible for the gases to pass more easily through the joints of the refractory at the end closer to the feed end.

By making similar studies in other kilns that had also been provided with this insulating material, it was found in every case that the rust appeared on the shell wherever the insulating material had been placed, but

Another view of the plate of the shell after removing the lining

the plate was quite clean wherever the refractory had been applied directly on the shell.

Other Instances

Tests were made at a cement plant that was using a dry process kiln without any insulation between the refractory and the shell and which was burning lignite with 5 to 6% sulphur and yet the plate was perfectly clean. A final test was made in another dry process plant where two kilns running side by side had been lined with this insulating material.

One of the kilns had been working for close to five years, and upon tearing the lining out, it was found that the shell was strongly corroded. It is reported that in a small area of about 0.62 sq. in., 0.0154 ounces of Fe_2O_3 was found. The other kiln that had only operated for a few months was hardly attacked.

It is therefore very important before applying insulating materials of the kind mentioned above to make a study of the manner in which the shell should be protected, such as by anti-acid paints or the application of some other material between the insulating brick and the shell. The manager of the Asland plant is quite anxious to know if some other cement plants, especially in the United States, have had similar experiences and if they have found some means of eliminating the trouble described above.

Eliminates Subsidiary

Standard Lime and Stone Co., Baltimore, Md., has had transferred to it all the property, real, personal and mixed, of the Washington Building Lime Co., Woodville, Ohio, a former subsidiary.

Insulating Plaster

F. E. Schundler & Co., Inc., Long Island City, N. Y., has placed on the market a dry mix of gypsum and heat-expanded vermiculite in 100-lb. bags, for an insulating plaster. The new plaster weighs 50% less than dry sanded gypsum plaster mix and provides insulation against both temperature and sound.

New Project

Huron River Silica Co., Detroit, Mich., has been incorporated, and is offering 300,000 shares of common stock to the public, to develop a 160-acre silica deposit and build a $170,000 processing plant for 2000 tons daily at South Rockwood, Monroe county, adjoining the Detroit & Toledo Short Line R. R. and the Huron River. The deposit is said to contain 20,000,000 tons of recoverable sand. Officers of the company are: President, A. Tennyson Pryor; vice-president in charge of operations, Hugh L. Joseph; vice-president and fiscal manager, Edward C. Huebner; secretary, William F. Morgain-Dean; treasurer, Joseph W. McDougal.

Building

United States Gypsum Co., Chicago, Ill., is building a one-story addition to its factory and storage and distributing plant on North Kostner St., Hermosa, Ill.

Silicosis Conference

New York State's Industrial Commissioner Elmer F. Andrews' advisory committee on control of silica dust in rock drilling met in New York City, July 29. At the meeting were government and state representatives, contractors and special representatives of industrial, social and insurance organizations. A schedule of tests for approval of dust control equipment and methods, submitted in outline to the committee, was referred for refinement and elaboration to a sub-committee consisting of George P. Keogh, Industrial Code Referee of the State Labor Department; Dr. Daniel Harrington, chief of the health and safety branch of the U. S. Bureau of Mines, and Dr. R. R. Sayers of the United States Public Health Service.

The phase of the discussion relating to the definition of injurious silica concentrated in a cubic foot of air and to the number of particles of silica dust constituting such injurious concentration was referred for study to another subcommittee consisting of Dr. W. J. McConnell, director of industrial health section, Metropolitan Life Insurance Co.; Dr. Leroy U. Gardner, director of the Saranac Laboratory for the Study of Tuberculosis, and Dr. Sayers. The discussion at the meeting dealt with conditions encountered in rock-drill work, experiences in combating dust hazards and existing or contemplated agencies to control dust in industry.

HINTS AND HELPS FOR SUPERINTENDENTS

Handles Stripping Economically

By John A. Buechler
Superintendent, Saxtet Sand and Gravel Co., Victoria, Tex.

KNOWING your efforts to get the dope on anything new, I am enclosing herewith three photos of a stripping apparatus that I built, and which is working out very satisfactorily in practice, and also financially

You will note a double row of pontoons on which is built a railroad track of standard gauge and 80-lb. rail. On this track we have a cart 9 ft. long and 6 ft. wide and 3 ft deep, holding and carrying from four to six yards of earth, and receiving its load at the receiving end of a ¾-yd. dragline bucket It is then run to the discharge end, a distance of nearly a hundred feet. One pair of truck wheels runs down a 50-deg. incline and the other stays at the top of the rail. It strikes a cushioned bumper when at this point, and the load slides out. It is then run back to receiving position by drum and cable powered by a 20-hp. gasoline motor

This arrangement does away with three trucks; and it moves, on an average, more earth than three 2-yd. dump trucks have done. The dragline, which is on top of the stripping, is simply swung over to the water side instead of the land side to discharge its load. It makes possible a saving of at least $3 per hour, or $30 every 10 hours. It requires only one man to operate the thing.

Since the above was written I have added a loading hopper on the shore end of the trestle, so that the dragline does not have to wait for the car to make the round trip. This saves another $1 an hour over the original stripping cost.

The loading hopper is supplied with a bottom, sliding gate, which I built to operate automatically. It slides on a pair of 12-in. wheels or rollers on each side, running in 12-in. channels. When the dump car comes under the hopper it opens this gate, and when the loaded car is hauled out it closes it

Receiving end of trestle system for hauling away stripping, as originally constructed

Close-up of cart receiving material directly from dragline, at the time the system was first built

The cart of the stripping apparatus discharges its load in five seconds

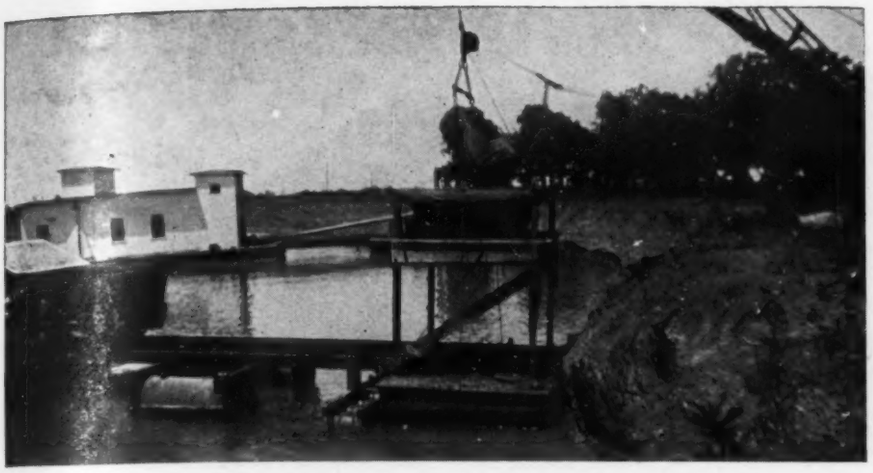
Curing Leaks in Plaster Mixers

By A. M. Turner
Supervisor of Plaster Quality, Three Forks Portland Cement Co., Hanover, Mont.

IF SOME of the contents of a plaster mixer leak out during the mixing period the result is a product that is not uniform. For instance, if calcined gypsum and retarder are being mixed, some of the gypsum may leave the mixer without retarder, while the rest will have more than its proportionate share. Consequently a non-uniform product will result. Since the defective material is often not located before shipment, the consumer encounters difficulty with the product in the field. Naturally, the manufacturer has trouble on his hands which is often costly.

Mixers should be frequently checked while in operation by observing the discharge area below the machine to see if material is escaping at such times as the mixer gates are closed. Another method of checking, which often gives a clue as to how the mixer is performing, comes by observing the results of laboratory tests. If the results of tests on samples coming from the mixer are not uniform the cause is often found to be coming from a leak in the machine.

The Broughton mixer is the standard type of machine used in the manufacture of gyp-



Loading hopper recently added on shore end of trestle

sum products (see accompanying cross section diagram). The natural assumption would be that any leak in this machine would be past the gate slides. This usually is the case, and the difficulty can be remedied by adjusting the rollers which hold the slides in place. However, the writer has observed a condition at two plaster mills where a mixer was known to leak and the slides were frequently adjusted, but material continued to leak out of the mixer. The solution for this condition is described as follows:

Send in your "hint." Photo, sketch or blueprint and a brief description nets you $5.—The Editor.

By observing the cross-sectional diagram of a Broughton mixer one can see that the two cylindrical sections of the housing come almost together at the center of the machine, marked *A*, or at the saddle. To join these sections this saddle is capped by an angle iron running the length of the mixing chamber. Probably due to the heat of the plaster as it is sometimes mixed this cap pulls away from the mixer housing, leaving an opening as indicated by the arrows, through which the mixer contents will readily flow.

An opening which develops in this way can be satisfactorily plugged with Okum, asbestos rope or something similar and then by tightening the bolts as much as possible, which hold the cap in place.

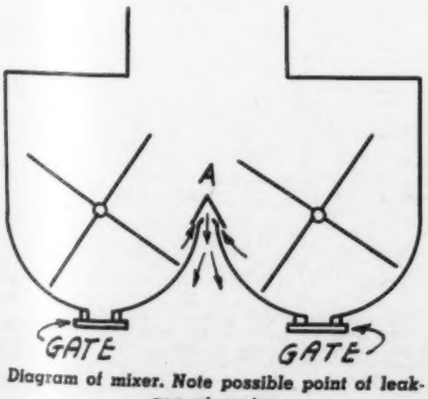


Diagram of mixer. Note possible point of leakage at center

Safety Belts Are Life Savers

THE *Red Ring Record*, house organ of the Missouri Portland Cement Co., St. Louis, Mo., reports a recent incident as follows:

"A workman prepared to bar a rock into a larger crusher. He placed his bar under the rock, which fell in such a way as to cause the bar to fly up and strike the man on the chin. Dazed by the blow, he fell against the bonnet of the crusher, but was caught by his safety belt and prevented from falling further into the crusher. The accident resulted in only a slight head injury. But for the safety belt it might have proved fatal, for the crusher, of the gyratory type, was amply large for his body to pass through.

The wearer of a safety belt is as secure as the anchor to which he is tied

"There are several points to be remembered in the maintenance and use of belts and ropes for there are probably few articles of safety equipment that are as important in an emergency as the safety belt. When it serves us, it serves us well, for at those times a life is often at stake.

"The rope should always be in the best of condition. Our policy is to renew all life ropes, regardless of condition, at the end of six months' service. If the rope becomes damaged before that time, it should be immediately taken out of service.

"The belt should always be maintained in the best of condition and should be discarded on any sign of drying out, tearing at the seams or other damage.

"Given a good rope and belt the user is as secure as the anchor to which he ties. Steel-work can generally be relied upon; but for outside work, unanchored objects, stumps and trees should be carefully selected. A mere tug on the rope is not a sufficient test, for in case of a fall, a man will exert much more pull than he would by tugging at it.

"The rope should always be used with a minimum of slack. This prevents excessive strain on the body when the slack is taken out of the rope at the end of a fall.

"Always remember your life belt may some day be your life saver."

Traction for Trucks

WHEN sand or gravel is stockpiled and later reclaimed by loading directly to trucks from the pile, the truck is very apt to get stuck in the pile, unless provided with some form of trackage or roadway. This is particularly true when the loading is done by hand, as the truck must get close to the pile to permit of easy loading. Since much of relief work is hand labor, there is a considerable amount of hand loading being done in the rock products industry at the present time. Running trucks on planks to the stockpile can be done but is usually unsatisfactory unless a large number of planks are laid crossways, and this is likely to be expensive.

A better method is to use old flattened-out surfaces from revolving screens, which are generally available at most gravel plants. Such screen surfaces readily support a truck and also, because of the holes, provide good traction for starting up. Moreover, they are very easily moved, so can be used at the most convenient points around the pile. The accompanying picture shows a number of screen surfaces used to form a roadway on a sand stockpile at the Bardwell, Wis., plant of the Moulding-Brownell Corp. As this plant was closed at the time, there was no equipment available for loading, and trucks were loaded by hand. Screen surfaces might also be used for muddy spots.

Old screen surfaces prevent trucks from getting stuck in sand pile

Recent Quotations on Rock Products Securities

Stock	Date	Bid	Asked	
Allentown P. C., com.[47]	8-31-36	6	8	
Allentown P. C., pfd.[47]	8-31-36	8	10	
Alpha P. C., com	8-21-36	24½	25¼	
American Aggregates, com.[48]	8-17-36	¾	1¾	
American Aggregates, pfd.[48]	8-17-36	4	6	
American Aggregates, 6's 1st mtg. 3/6's, 1943, new bonds[48]	8-17-36	50	53	
American Aggregates, 6's, 1943, old bonds[48]	8-17-36	50	53	
Arundel Corp., com	8-31-36	18	actual sale	
Ashgrove L. & P. C., com.[47]	8-31-36	12	15	
Ashgrove L. & P. C., pfd.[47]	8-31-36	97	100	
Bessemer L. & C., com.[47]	8-31-36	5	6	
Bessemer L. & C., pfd.[47]	8-31-36	24	27	
Bessemer L. & C., 1st 6½'s, 1947[46]	8-17-36	87	92	
Bessemer L. & C., cert. of dep., 1947[46]	8-15-36	85	...	
Boston S. & G., com.[37]	8-17-36	1	2	
Boston S. & G., new 7% pfd.[37]	8-17-36	8	10	
Boston S. & G., 7's, 1939[37]	8-17-36	70	...	
Calaveras Cement, com.[46]	8-17-36	5¼	6¼	
Calaveras Cement, 7% pfd.[46]	8-17-36	89	93	1.00 (ac.) Sept. 1*
California Art Tile, A[9]	8-17-36	17½	18	.50 Sept. 1
California Art Tile, B[9]	8-17-36	3	4	
Canada Cement, com.[42]	8-17-36	6¾	6⅞	
Canada Cement, pfd.[42]	8-17-36	77½	78	
Canada Cement, 5½'s, 1947[42]	8-17-36	106¼	107	
Canada Crushed Stone, 6½'s, 1944[42]	8-17-36	90	...	
Certainteed Products, com	8-31-36	10	actual sale	
Certainteed Products, pfd.	8-31-36	100	actual sale	
Certainteed Products, 5½'s, A, 1948	8-31-36	91	actual sale	
Consol. Cement, 1st 6's, 1950[50]	8-31-36	72	74	
Consol. Cement, A[50]	8-23-36	3¾	4¼	
Consol. Okla. S. & G., 6½'s, 1948[42]	8-17-36	15	25 nominal	
Consol. S. & G., pfd.[42]	8-17-36	32	...	
Consol. Rock Products, units[47]	8-31-36	80c	90c	
Construction Mat., com.[47]	8-31-36	10c	20c	
Construction Mat., pfd.[47]	8-31-36	½	1	
Consumers Rock & Gravel, 1st mtg. 6½'s, 1948[47]	8-31-36	29	32	
Coosa P. C., 1st 6's[47]	8-31-36	35	40	
Coplay Cement Mfg., pfd.[47]	8-31-36	12	15	
Coplay Cement Mfg., 6's, 1941[47]	8-31-36	90	95	
Cumberland P. C., 7's, 1937[47]	8-31-36	90	100	
Dewey P. C., com.[47]	8-31-36	45	50	
Dolese & Shepard	8-31-36	39	41	
Dufferin Pav. & Cr. Stone, pfd.[43]	8-17-36	70	72	
Federal P. C., 6½'s, 1941[47]	8-31-36	50	55	
Fla. P. C., 6½'s, 1937[46]	8-15-36	100¼	100⅝	
Fla. P. C., units[47]	8-31-36	21	23	
Giant P. C., com.[50]	8-23-36	2½	3½	
Giant P. C., pfd.[50]	8-23-36	17½	20½	
Gyp., Lime & Alabastine, Ltd.	8-21-36	7⅝	actual sale	
Gyp., Lime & Alabastine, 5½'s, 1948[47]	8-31-36	97	99	
Hawkeye P. C., cap.[47]	8-31-36	33	35	
Hercules Cement, com.[47]	8-31-36	35	40	
Hercules Cement, pfd.[47]	8-31-36	90	95	
Hermitage Cement, com.[47]	8-31-36	15	18	
Hermitage Cement, pfd.[47]	8-31-36	97	100	
Ideal Cement, com.[50]	8-23-36	79	81	
International Cement, com.	8-31-36	55½	actual sale	.50 Sept. 29
International Cement, conv. deb. 4's, 1945	8-31-36	158	actual sale	
Kelley Island L. & T.	8-21-36	22½	23	
Ky. Cons. Stone, 6½'s, 1938[47]	8-31-36	18	21	
Ky. Cons. Stone, com.[47]	8-31-36	1	2	
Ky. Cons. Stone, pfd.[47]	8-31-36	3	5	
Ky. Cons. Stone, 1st mtg., 6½'s[48]	8-15-36	16½	18	
Ky. Rock Asphalt, 6½'s, 1936[47]	8-31-36	25	30	
Lawrence P. C., com.	8-28-36	22	23	
Lawrence P. C., 5½'s, 1942[50]	8-31-36	100	102	
Lehigh P. C., com.	8-31-36	28	actual sale	
Lehigh P. C., 4% pfd.[50]	8-31-36	113	actual sale	1.00 (qu.) Oct. 1
Louisville Cement[47]	8-31-36	98	...	
Lyman-Richey 1st 6's, 1935[50]	8-31-36	27	...	
Marbelite Corp., com. (cement pts.)[46]	8-17-36	40c	75c	
Marbelite Corp., pfd.[46]	8-17-36	4	...	
Marblehead Lime, 7's, 1944[34]	8-17-36	97	98	
Marquette Cement, com.[50]	8-23-36	38	39	
Marquette Cement, pfd.[50]	8-23-36	99	102	
Material Service Corp.[47]	8-31-36	7	8	
McCrady-Rodgers, com.[47]	8-31-36	6	7	
McCrady-Rodgers, 7% pfd.[47]	8-31-36	30	35	
Medusa P. C., com.	8-21-36	16	16	
Medusa P. C., pfd.[47]	8-31-36	65	75	
Michigan L. and C., com.[47]	8-31-36	40	45	
Minnesota Mining & Mfg. Co.[30]	8-31-36	31¾	...	
Missouri P. C.	8-23-36	15	...	
Monarch Cement, com.[47]	8-31-36	97	100	
Monolith P. C., com.[9]	8-17-36	3¼	3¾	
Monolith P. C., 8% pfd.[9]	8-17-36	6½	7	.25 (ac.) Aug. 12
Monolith P. C., units[50]	8-23-36	15½	17½	
Monolith P. C., 1st mtg.[9]	8-17-36	104	105	
Monolith Portland Midwest, pfd.[9]	8-17-36	2½	3	
National Gypsum, A, com.[47]	8-31-36	53	54	
National Gypsum, 1st pfd.[47]	8-31-36	104	105	1.75 (qu.) Oct. 1
National Gypsum, 2nd pfd.[47]	8-31-36	16	17	.25 (qu.) Oct. 1
National L. & S., 6½'s, 1941[47]	8-31-36	95	100	
Nazareth Cement, com.[47]	8-31-36	6	7	
Nazareth Cement, pfd.[47]	8-31-36	55	60	
Newaygo P. C., 7% cum. pfd.[47]	8-31-36	75	85	
New England Lime, units[34]	8-31-36	12	14	
N. Y. Trap Rock, 1st 6's, 1946	8-21-36	80½	80½	
N. Y. Trap Rock, 6's, stamped, 1946	8-21-36	85	85½	
N. Y. Trap Rock, 7% pfd.[46]	8-15-36	60	...	
North Amer. Cement, 1st 6½'s, 1953	8-25-36	47¼	49¼	
North Amer. Cement, 6½'s, 1943[50]	8-31-36	96	97	
North Amer. Cement, 6½'s, 1940[50]	8-31-36	67	73	
North Amer. Cement, "A" pfd.	8-25-36	4¾	5½	
North American Cement "B"[47]	8-25-36	5½	6½	
North Shore Mat. 1st 6's[47]	8-31-36	40	45	
Northwestern P. C., units[9]	8-17-36	53	56	
Northwestern States P. C.[47]	8-31-36	24	25	
Ohio River S. & G., com.	8-28-36	1	...	
Ohio River S. & G., 1st pfd.	8-28-36	63	...	
Ohio River S. & G., 2nd pfd.	8-28-36	4	...	
Ohio River S. & G., 6's[46]	8-15-36	10	...	
Oregon P. C., com.[47]	8-31-36	3	5	
Oregon P. C., pfd.[47]	8-31-36	92	95	
Oregon P. C., conv. pfd.[47]	8-31-36	60	65	
Pacific Coast Agg., new com.[40]	8-17-36	2¾	3	
Pacific P. C., com.[40]	8-17-36	3¾	5	
Pacific P. C., pfd.[40]	8-17-36	44	46½	
Peerless Cement, com[50]	8-23-36	2	3	
Peerless Cement, pfd.[50]	8-23-36	23	27	
Penn.-Dixie Cement, com.	8-31-36	6½	actual sale	
Penn.-Dixie Cement, pfd. A	8-31-36	39½	actual sale	
Penn.-Dixie Cement, 6's, A, 1941	8-31-36	96¾	actual sale	
Penn. Glass Sand Corp., com.[47]	8-31-36	20	23	
Penn. Glass Sand Corp., pfd.[47]	8-31-36	120	125	1.75 (qu.) Oct. 1
Penn. Glass Sand Corp., 1st M 4½'s, 1960	8-31-36	105	106	
Petoskey P. C., 6's, 1941[48]	8-17-36	85	...	
Petoskey P. C., 6's, 1935-38[48]	8-17-36	90	...	
Petoskey P. C., com.[48]	8-17-36	2¾	3½	
Republic P. C., 6's, 1943[50]	8-31-36	103	...	
Riverside Cement, A[9]	8-17-36	11¼	12½	
Riverside Cement, B[9]	8-17-36	1⅝	1⅞	
Riverside Cement, pfd.[9]	8-17-36	99	102	
Rockland & Rockport Lime, 1st pfd.[47]	8-31-36	5	7	
Santa Cruz P. C., pfd.[9]	8-17-36	44	47	
Schumacher Wallboard, com.[9]	8-17-36	4	5	
Schumacher Wallboard, pfd.[9]	8-17-36	18¼	19¼	
Signal Mt. P. C., units[50]	8-31-36	49	52	2.00 Aug. 15
Southwestern P. C., units[40]	8-17-36	200	...	
Spokane P. C., units[47]	8-31-36	12	15	
Standard Pav. & Mat. (Can.), com.[43]	8-17-36	3	3¼	
Standard Pav. & Mat., pfd.[43]	8-17-36	20	24	
Superior P. C., A[40]	8-17-36	39½	42½	.27½ (ac.) Sept. 1†
Superior P. C., B[40]	8-17-36	11¼	15	
Trinity P. C., units[47]	8-31-36	30	33	
U. S. Gypsum, com.	8-31-36	100½	actual sale	.50 (qu.) Oct. 1
U. S. Gypsum, pfd.	8-31-36	164½	...	1.75 (qu.) Oct. 1
Volunteer P. C., 1st 7's, 1942[47]	8-31-36	95	100	
Volunteer P. C., units[47]	8-31-36	4	5	
Vulcanite P. C., com.[47]	8-31-36	6	8	
Vulcanite P. C., 7½'s, 1943[47]	8-31-36	98	100	
Wabash P. C.[47]	8-31-36	10	11	
Warner Co., ww, 1st 6's, 1944[47]	8-31-36	80	82	
Warner Co., com.[47]	8-31-36	6	7	
Warner Co., pfd.[47]	8-31-36	15	16	
Whitehall Cement Mfg. com.[47]	8-31-36	42	45	
Whitehall Cement Mfg., pfd.[47]	8-31-36	45	50	
Wisconsin L & C., 1st 7's, 1940[47]	8-31-36	80	85	
Wolverine P. C., com.[47]	8-31-36	6	7	
Yosemite P. C., A com.[40]	8-17-36	5½	5¾	

Quotations by: [9]A. E. White Co., San Francisco, Calif. [16]The Securities Co. of Milwaukee, Inc., Milwaukee, Wis. [37]Wise, Hobbs & Seaver, Inc., Boston. [40]Martin Judge, Jr., and Co., San Francisco, Calif. [42]Nesbitt, Thomson & Co., Toronto. [46]First National Bank of Chicago, Chicago, Ill. [47]Anderson Plotz and Co., Chicago, Ill. [48]Hewitt, Ladin & Co., New York, N. Y. [50]Rogers & Tracy, Inc., Chicago, Ill.

* This leaves arrears of $12.25.

† This leaves arrears of $2.75.

Recent Dividends Announced

California Art Tile, pfd.	$0.50	Sept.	1, 1936
International Cement Corp., com.	.50	Sept.	29, 1936
Lehigh Portland Cement Co., 4% pfd. (quar.)	1.00	Oct.	1, 1936
National Gypsum 1st pfd. (quar.)	1.75	Oct.	1, 1936
2nd pfd. (quar.)	.25	Oct.	1, 1936
Pennsylvania-Glass Sand, pfd. (quar.)	1.75	Oct.	1, 1936
Superior P. C., A	.27½	Sept.	1, 1936
U. S. Gypsum, com. (quar.)	.50	Oct.	1, 1936
pfd. (quar.)	1.75	Oct.	1, 1936

◆ ◆ ◆

Trinity Portland Cement Co., Dallas, Texas, reports sales and earnings for the year ended December 31, as follows:

	1935	1934
Net sales	$1,241,581	$1,006,629
*Net profit	8,878	(d)62,939
†Earned per share, com.	(d)$6.49	(d)$10.60

Number of common shares, 17,500.
*After depreciation, depletion, etc. †Disregarding preferred dividend arrears.

The last preferred stock dividend was paid in 1926. On December 31, 1935, preferred dividends were in arrears $1,408,750. Current assets as of December 31, 1935, were $970,181, and current liabilities were $128,117. Working capital was increased from $538,729 on December 31, 1934 to $842,064 on December 31, 1935.

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Pennsylvania-Dixie Cement Corp., New York City, and subsidiaries, report for 12 months ended June 30, 1936, shows profit of $1,319,188 before deductions, comparing with profit of $1,204,295 for the 12 months ended June 30, 1935. After provision for depreciation, depletion, interest, and federal income taxes, there was a net loss of $618,397 against net loss of $712,783 for the 12 months ended June 30, 1935.

Current assets as of June 30, 1936, amounted to $4,590,965 and current liabilities were $522,739 comparing with $4,211,385 and $452,155, respectively, on June 30, 1935.

Consolidated income account for 12 months ended June 30, 1936, compares:

	1936	1935
Gross profit	$1,319,188	$1,204,295
Depreciation and depletion	1,372,472	1,364,388
Loss	$53,284	$160,093
Interest	520,888	552,690
*Federal income tax	44,225	.....
Net loss	$618,397	$712,783

* Provision for federal income tax, notwithstanding this statement does not show a profit, results from requirement by Internal Revenue Bureau that depreciation for income tax purposes be calculated on original property values whereas on books of company it is calculated on sound property values determined by appraisal and set up on the books at the inception of the corporation.

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Lehigh Portland Cement Co., Allentown, Penn., reports for 12 months ended June 30, 1936, net profit of $1,170,857 after depreciation, depletion, obsolescence and normal federal income taxes. Based on the new capital set-up, the above net profit is equivalent after allowing for 12 months' dividend requirements on 121,467 shares (par $100) 4% preferred stock, to $1.38 a share on 495,628 shares (par $25) of common stock. No provision has been made for federal surtaxes on undistributed profits.

This compares with net profit for the 12 months ended June 30, 1935, of $682,649, equal, on present basis, to 39c a share, common stock.

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Pacific Coast Aggregates, Inc., San Francisco, Calif., and wholly-owned subsidiary, reports for the six months ended June 30, 1936, consolidated net loss of $24,920, after depletion and depreciation, as compared with a net loss of $10,660 in the preceding six-month period and a net loss of $91,632 in the first half of 1935.

Sales in the first six months of 1936 increased 2% over sales in the preceding six-month period, whereas sales in that period were 36.6% in excess of sales in the six months ended June 30, 1935.

The company reported, as of June 30, 1936, total current assets of $555,305, including $75,476 cash, and total current liabilities of $194,113, which provided the company with a working capital of $361,192, as contrasted with $340,090 at the end of 1935 and $325,849 on June 30, last year.

The company recently was reorganized under section 77-B of the Bankruptcy Act, and emerged with but one class of stock and no funded debt as contrasted with bonds and debentures, preferred and common stock previously outstanding.

Six months' earning statement for the period ended June 30, 1936, compares as follows:

	Six months ended June 30, '36	June 30, '35
Sales	$750,550	$538,123
Cost of sales	590,150	458,087
Profit on sales	$160,400	$80,036
Selling and administrative expense	94,557	83,759
Operating income	$65,843	*$3,759
Other income (net)	5,138	*439
Total income before charges	$70,981	*$4,198
Depletion	9,994	6,596
Depreciation	78,022	72,635
Share of subsidiary's loss	7,895	8,202
Net loss	$24,920	$91,632

* Loss.

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Pennsylvania Glass Sand Corp., Lewiston, Penn., and wholly owned subsidiaries, for the six months ended June 30, report net income of $188,301 after depreciation, depletion, interest, amortization and federal income taxes, but exclusive of federal surtax on undistributed earnings. This is equivalent after dividend requirements on 27,245 no-par shares of $7 preferred stock, to 31 cents a share of 298,346 no-par shares of common stock, excluding 1,654 shares in treasury.

Consolidated income account for six months ended June 30, 1936, follows: Profit from operations $403,103; depreciation and depletion $78,379; operating profit $324,724; other income $26,837; total income $351,561; interest and amortization $120,260; estimated federal income taxes $43,000; net income $188,301.

Current assets as of June 30, last, including $234,890 cash, amounted to $647,364 and current liabilities were $234,484. Inventories amounted to $126,986.

United States Gypsum Co., Chicago, Ill., reports a comparative consolidated profit-and-loss account for the six months periods ending June 30, 1935 and 1936, as follows:

	1936	1935
Net Profits on Operations before provisions for depletion, depreciation and income taxes	$3,483,666	$2,592,725
Other Income:		
Interest on securities (less amortization of premiums)	$ 32,145	$ 71,104
Other interest, royalties, rents, etc. (net)	130,889	91,770
Profit on sale of securities	47,846	45,041
Total other income	$ 210,880	$ 207,914
Total net profits on operations and other income before provisions for depletion, depreciation and income taxes	$3,694,546	$2,800,639
Deductions from Income:		
Loss on retirement of plant assets	$ 21,439	$ 9,344
Expense of idle mills	9,053	7,465
Total deductions from income	$ 30,493	$ 16,809
Net profits from all sources before provisions for depletion, depreciation and income taxes	$3,664,054	$2,783,830
Deduct—Provisions for:		
Depletion of mineral deposits and timber	$ 18,448	$ 13,580
Depreciation of buildings, machinery, etc., based on rates consistent with prior years'	990,946	928.566
Federal and Dominion income taxes	412,886	214,208
Total	$1,422,280	$1,156,353
Net profits for period	$2,241,774	$1,627,477
Per share on common stock	1.65	1.14

Operations of the Canadian subsidiaries are included in the above profit-and-loss accounts on the basis of dollar parity.

Earned surplus on June 30, 1936, amounted to $21,638,142, compared with $20,564,222 on January 1, 1936.

For twelve months ended June 30, 1936, company's preliminary report shows net income of $4,105,549 after the above deductions, equal after preferred dividends, to $2.98 a common share, as compared with $2,641,177 or $1.76 a share in preceding 12 months.

Current assets as of June 30, 1936, including $13,000,470 cash and marketable securities, amounted to $22,915,030 and current liabilities were $3,392,001. This compares with cash and marketable securities of $14,059,596, current assets of $21,239,412 and liabilities of $1,817,835 on June 30, 1935.

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Coplay Cement Manufacturing Co., Coplay, Penn., reports consolidated income account for the years ended December 31, as follows:

	1935	1934
Gross operating profit	$144,973	$169,540
Depreciation and depletion	128,914	132,606
Balance	16,059	36,934
Interest charges	22,632	23,265
Other deductions (net)	6,085	(cr)4,922
Net income	(d)12,660	18,592
Preferred dividends	14,058	14,085
Surplus for year	(d)26,718	4,507
Earned per share, pfd.	nil	$1.89
Earned per share, com.	(d)$3.61	(d)$2.04

Current assets as of December 31, 1936, were $527,167, and current liabilities were $25,430.

TRAFFIC and TRANSPORTATION

Proposed Rate Changes

THE FOLLOWING are the latest proposed changes in freight rates up to and including the week of August 22.

Trunk

34808. To cancel, as obsolete, commodity rate of $2.30 per net ton on **gravel** from Lacona, N. Y., to Harpursville, N. Y., in Item 1775 of N. Y. C. R. R. Tariff I. C. C. N. Y. C. 16822.

34943 (Supps.) **Crude fluxing limestone,** C. L., (See Note 2), to Phoenix, N. J., from Engle, Martinsburg, Bellefonte, Pleasant Gap, Inwood and Millville, W. Va., $2.30, Stephens City, Capon Road, Strasburg and Strasburg Junction, Va., $2.52 per gross ton.

Sup. 3 to 34943. **Crude fluxing limestone,** C. L., (See Note 2), to Phoenix, N. J., from Cavetown and Security, Md., $2.05, from Thomasville, Bittinger and York, Penn., $1.75 per net ton.

Sup. 1 to 34974. **Sand** (other than ground or pulverized or naturally bonded molding), and **gravel,** in open top cars without tarpaulin, C. L., (See Note 2), from Palmerton, Penn., to Dunmore, Penn., $1.20 per net ton.

34984 (Sup. 1.) **Gravel, sand, slag and stone,** crushed, coated*, C. L., (See Note 2), from Greer, W. Va., to Junior, W. Va., $1.46 per net ton.

Sup. 1 to 35021. **Slate,** crushed, dust or ground, C. L., minimum weight 50,000 lb., from Bangor and Pen Argyle, Penn., to Boston Stations, Mass. Rate, 18½c per 100 lb.

35032. **Crushed stone,** C. L., in open top equipment, from Snow Flake, W. Va., to Huttonsville, W. Va., $1.60 per net ton.

35037. **Sand,** C. L., (See Note 2), to Carleton Place, Ont., from Woodbridge, Genasco, Perth Amboy, South Amboy, Ernston, Runyon, Old Bridge, N. J., 26½c per 100 lb.

35042. **Crushed stone and screenings,** in straight or mixed carloads (not agricultural limestone or ground limestone, unburnt; fluxing stone or firestone, or stone, coated), (See Note 2), from Monocacy, Penn., to Mt. Morris, N. Y., $2.50 per net ton.

35066. **Stone,** crushed, coated*, in bulk in open top equipment, in straight carloads, (See Note 2). From Wertz, Penn., to DuBois, Penn., $1.46 per net ton.

35069. **Stone, natural** (other than bituminous asphalt rock), **crushed,** C. L., (See Note 2), from Oriskany Falls, N. Y., to Oswego, N. Y., $1.10 per net ton.

35073. (a) **Sand (other than ground or pulverized or naturally bonded molding) and gravel,** in open top cars, without tarpaulin, C. L.

(b) **Sand and gravel (other than ground or pulverized),** in closed cars or in open top cars with tarpaulin and **Sand, naturally bonded molding,** in open top or closed cars, C. L., (See Note 2), from Flanders, N. J.,

(Proposed rates in cents per 2000 lb.)

To	(a)	(b)
Ansonia, Conn.	225	240
Bridgeport, Conn.	225	240
Hartford, Conn.	240	250
New Britain, Conn.	240	250
Plainville, Conn.	225	240
Waterbury, Conn.	225	240
Springfield, Mass.	270	270
Boston, Mass.	310	310

35080. (A) **Sand** and **gravel** as described in 35073. From Flanders, N. J. Rates (in cents per net ton):

To	(a)	(b)
Passaic, N. J.	100	100
New Brunswick, N. J.	110	120
Erie, Penn.	280	280
York, Penn.	185	200
Irvington, N. J.	120	130
Watertown, N. Y.	270	270
Elmira, N. Y.	170	190
Syracuse, N. Y.	185	200

*Note—The oil, tar and/or asphaltum not to exceed 10% by weight of the commodity shipped, the shipper to so specify on shipping orders and bills of lading.

35089. **Limestone, crude, fluxing, foundry and furnace,** C. L., (See Note 2), from Lime Crest and McAfee, N. J., to Vulcanite, N. J. Rate $1.05 per gross ton.

35095. **(A) Sand and gravel** (other than ground or pulverized, or naturally bonded molding), in open top cars, without tarpaulin, C. L. **(B) Sand** (other than ground or pulverized), in closed cars or in open top cars with tarpaulin, C. L. **Sand,** naturally bonded moulding, in open top or closed cars, C. L. A and B (See Note 2), from Buffalo, N. Y., to points in New York and Pennsylvania rates ranging from 60c to $1.80 per net ton.

35097. **Rip rap stone,** C. L., (See Note 2), from Port Deposit, Md., to Camden, N. J., $1.40 per net ton.

35098. **Slag,** C. L., (See Note 2), from Sparrows Point, Md., to P. R. R. stations 11260—Old Point Comfort to 11263—Portsmouth, Va., $1.80, and 11302—Willow Grove to 11310—Kiptopeke, Va., $1.70 per net ton.

Proposal to establish on **stone, crushed or rubble, grout, rip rap, C. L.,** (See Note 2), from South Unadilla, N. Y., to various points in New York and Pennsylvania. Rates ranging from 4 to 7c per 100 lb.

35126. **Gravel, sand, slag and stone,** crushed, coated with oil, tar or asphaltum,* (See Note 2), from Security, Md., to Webster Springs, W. Va., $1.89 per net ton.

35129. To cancel from W. Md. Ry. I. C. C. 8404 rates on **sand and gravel,** C. L., to destinations in Trunk Line and C. F. A. territories per column B from all origins and columns A from all origins except Baltimore, Cumberland, Hancock and Round Top, Md., Pierce, W. Va., and York, Penn., and to cancel from B. & O. R. R. I. C. C. 21754 Group 2 rates applying on **industrial sand,** C. L., from Cumberland, Md., to destinations in Trunk Line territory.

M-3536. To establish on **stone, natural** (other than bituminous asphalt rock), crushed, coated with oil, tar or asphaltum, C. L., and **slag** (product of iron or steel blast or open hearth furnaces), not ground or pulverized, coated, in bulk, in open top equipment, C. L., from Cheektowaga, N. Y., to points in Pennsylvania on the B. & O. R. R., P. R. R. and Erie R. R., rates ranging from $1.13 to $1.37 per net ton.

M-3538. **Slate, dust, crushed or ground,** C. L., minimum weight 50,000 lb., to Lachine and Montreal, Que., the following rates: From Bangor, Penn., 24; Pen Argyle, Penn., 24; Easton, Penn., 24; Easton (Bushkill), Penn., 24; Easton (13th St.), Penn., 24; Slatington, Penn., to Slatedale, Penn., 24; Whiteford, Md., 32½; Cardiff, Md., 32½; Delta, Penn., 32½; Slate Hill, Penn., 32½; Albany, Penn., 24; Lenhartsville, Penn., 24; Virginville, Penn., 24.

M-3547. (A) **Stone, natural** (other than bituminous asphalt rock), crushed, C. L.; **slag** (product of iron or steel blast or open hearth furnaces), not ground or pulverized, in bulk, in open top equipment, C. L. (to apply from Buffalo, N. Y., only). (B) **Stone, natural** (other than bituminous asphalt rock), crushed, coated with oil, tar or asphaltum, C. L.*; **slag** (product of iron or steel blast or open hearth furnaces), not ground or pulverized, coated, in bulk, in open top equipment, C. L.* (to apply from Buffalo, N. Y., only, (See Note 2), from Akron, Bowmansville, Buffalo, LeRoy, North LeRoy and Stafford, N. Y. to Trunk Line and C. F. A. territory, various rates.

Central

47700. To establish on **crushed stone,** crushed stone screenings, crushed stone tailings, carload, Carey, O., to New Washington, O., 40c, to expire November 30, 1936. Via Northern Ohio Ry.

47704. To establish on refuse material consisting of **crude slag,** or **burnt sand,** carloads, Midland, Penn., to East Liverpool, O., 40c net ton. Via P. R. R.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

47706. To establish on **firestone, sawed or chipped,** minimum weight 60,000 lb., from New Castle, Penn., to Illinois, Ohio, Michigan, Pennsylvania: Aliquippa, Penn., 135c; Buffalo, N. Y., 350c; Butler, Penn., 135c; Cleveland, O., 160c; Chicago, Ill., 325c; Detroit, Mich., 240c; E. Moline, Ill., 470c; Johnstown, Penn., 240c; Kalamazoo, Mich., 295c; Lorain, O., 160c; McKeesport, Penn., 135c; Middletown, O., 240c; Midland, Penn., 120c; Pittsburgh, Penn., 135c*; Port Huron, Mich., 310c; Rock Island, Ill., 470c; Sharon, Penn., 90c; Springfield, O., 240c; Wheeling, W. Va., 165c; Youngstown, O., 90c*; Camden, N. J., 400c; Rochester, N. Y., 280c; Steelton, Penn., 380c; Worcester, Mass., 480c; New York, N. Y., 440c. *Rate proposed also for rough quarried firestone.

47707. To establish on **sand,** naturally bonded moulding, in open or closed cars, from Bellaire, O., to Pennsylvania points: Altoona, 180c; Beaver Falls, 130c; Bessemer, 130c; Blairsville, 160c; Braddock, 130c; Connellsville, 150c; Coraopolis, 130c; Donora, 130c; Duquesne, 130c; East Pittsburgh, 140c; Ellwood City, 130c; Erie, 180c; Franklin, 180c; Indiana, 160c; Johnstown, 170c; Latrobe, 150c; McKeesport, 130c; New Castle, 140c; Oil City, 180c; Pittsburgh, 120c; Sharon, 150c; Sharpsville, 150c; Titusville, 190c; Warren, 200c. To West Virginia points: Clarksburg, 140c; Grafton, 140c; Wheeling, 90c.

47708. To establish on **sand,** industrial, carloads, from Bellaire, Ohio, to various Ohio destinations.

	*1	*2	*3	*4
Akron 120	80	120	80	120†
Canton 110	..	140	90	110†
Cincinnati 160	150	180	160†	120
Columbus 130	130	160	150	80
Dayton 150	130	160	150†	110
Hamilton 160	150	180	160†	120
Marion 150	130	†150	150†	120
Newcomerst'wn 90	110	160	..	90
Toledo 180	140	140	150	140
Youngstown ..120	90	100	..	140

†Comparative rates.

*Key Points—[1]Massillon, Canton; [2]Girard, Penn., Conneaut; [3]Phalanx, M. & S. Valley; [4]Zanesville, Zanesville.

47739. To establish on **sand** (except industrial) and **gravel,** in open-top cars, from Erie, Penn., to Imperial, North Star and Moon Run, Penn., 140c, and McMurray and Library, Penn., 150c.

47741. To establish on **limestone,** agricultural, unburnt, in bulk, in open top cars, and screenings, agricultural limestone. From Genoa, Martin and Marblehead, Ohio, to Marietta, Ohio, 165c; to Roswell, Ohio, 125c; to Washington Court House, Ohio, 135c.

47772. To establish on **stone,** crushed, and **limestone,** unburned, agricultural, in bulk in open top cars, carloads, Kenton, Ohio, to Belle, Charleston, Nitro and Point Pleasant, W. Va., 125c per ton of 2000 lb. Via N. Y. C. R. R.

47782. To establish on **sand,** core, carloads, from Vassar, Mich., group to Bucyrus, Ohio, in open top cars, 170; in closed cars, 190; Rochester, N. Y., both cars, 230.

47783. To establish on **sand** (except industrial), and **gravel,** in open top cars, carload, Dundee, Ind., to Portland, Ind., 60c per ton.

47784. To establish on **crushed stone, chatt, slag or gravel,** coated with oil, tar, asphalt or asphaltum, in open top cars, Joliet, Ill., to Auburn, Ind., $1.88, per ton.

47805. To establish on **crushed stone,** carloads, (See Note 3), from Keeport, Ind., to Leesburg, Ind., 80c per ton of 2000 lb. Route —Via Wabash, Peru, Ind., Winona.

47816. To establish on **stone,** crushed, **slag** or **gravel,** coated with oil, tar or asphaltum,* in open top cars, carload, (See Note 3). From Bakerstown, Penn., to Evans City, Penn., 73c per ton of 2000 lb., subject to emergency charges, I. C. C. Docket Ex Parte No. 115. Via B. & O. R. R.

47819. To establish on **slag,** crude, granulated, crushed or commercial, C. L., in bulk, in open top equipment, in straight or mixed carloads, (See Note 3), from Hamilton, Ohio, to Kalamazoo, Mich., $1.55 per ton of 2000 lb.

47846. To establish on **(A) sand,** naturally bonded moulding, in all kinds of equipment, C. L.; sand (except naturally bonded moulding; ground or pulverized sand) in closed equipment, C. L.; and (C) sand (except naturally bonded moulding; ground or pulverized sand) in open top equipment, C. L., (See Note 3), but not for closed and open top cars of less marked capacity than 60,000 lb. and 80,000 lb., respectively, to Hagerstown, Md., from the Vassar, Mich., group, viz., Juniata, McHale, Vassar, and Wampson, Mich., 240c per net ton.

47869. To establish on **sand** (except industrial), and **gravel**, in open top cars, C. L., from Leeland, Ind., to North Baltimore, Ohio, 115c per net ton.

47870. To establish on **crude** and **fluxing limestone**, C. L., in open top equipment, C. L., from Dunbar, Penn., to Port Kennedy, Penn., 235c per gross ton, subject to emergency charge.

47877. To establish, in cents per net ton, on (a) **sand**, naturally bonded moulding, in all kinds of equipment, C. L.; **sand** (except naturally bonded moulding; ground or pulverized sand), in closed equipment, C. L.; and (b) sand (except naturally bonded moulding; ground or pulverized sand), in open top equipment, C. L., (See Note 3), but not for closed and open top cars of less marked capacity than 60,000 and 80,000 lb., respectively from Portland, N. Y.

To	(a)	(b)
Cadillac, Mich.	290	290
Detroit, Mich.	220	215
Flint, Mich.	240	240
Grand Rapids, Mich.	230	230
Lansing, Mich.	240	240
Pontiac, Mich.	230	230
Toledo, Ohio	200	185

47878. To establish on **stone**, crushed, in open top cars only, C. L., (See Note 3), from McDermott and Roca, Ohio, to Hamilton, Ohio, 115c per net ton.

47892. To establish on **dolomite**, roasted (refractory dolomite, in granular form, treated or untreated, clinkered, and burned to a dead state), C. L., from Bettsville, Maple Grove, Gibsonburg, Narlo and Woodville, Ohio, to Charleston, W. Va., 225c per net ton.

47894. To establish on **furnace** or **foundry limestone**, C. L., in open top cars, from Cleveland, Ohio (ex-lake), to Mansfield, Ohio, 92c, subject to emergency tariff. Will not include handling charges at Cleveland.

47917. To establish on **core sand**, C. L., in open top equipment, from Corry, Penn., to Dunkirk, N. Y., 80c per net ton, to expire December 31, 1936.

47932. To establish on **sand, refuse grinding**, C. L., from Toledo, Ohio, to Gladwin, Mich., 160c per net ton.

47933. To establish on **limestone**, ground or pulverized, unburnt, or **limestone dust**, unburnt, in box cars, C. L., from Ridgeville, Ind. (Rates in cents per net ton.) To Kokomo, Ind., 110; Madison, Ind, 140; North Vernon, Ind., 125; Franklin, Ind., 125; Columbus, Ind., 125; Shelbyville, Ind., 125.

Southern

12281. Establish 68c gross ton, **phosphate rock**, C. L. (not ground phosphate rock), minimum weight 80% of marked capacity of car, except that actual weight will govern when cars are loaded to full visible capacity, Old Colony, Fla., to East Tampa, Fla.

12291. Establish 415c net ton, **phosphate rock**, crude, ground or pulverized, not acidulated or ammoniated, C. L., minimum 80,000 lb., L. & N. R. R. Group 1 Tennessee origins in L. & N. R. R. G. F. O. 30-C, to Shreveport, La.

12309. Establish on **feldspar**, C. L., minimum 50,000 lb., Brookneal, Va., to certain S. W. F. B. points, rates made the same amount in cents per net ton higher than 14% of 1st class as rates recently authorized from Spruce Pine, N. C.

12346. Establish 225c net ton, **fullers earth**, in bags or sacks or in bulk in box cars (See Item 50, S. A. L. Ry. I. C. C. No. A-7780), C. L., minimum 50,000 lb., Superior, Fla., to Tampa, Fla., for export to foreign countries and for coastwise movement to Texas points.

12348. Cancel as obsolete rates on **sand and gravel**, C. L., Garysburg, N. C., to Back Bay, Creeds, Belcross, Fentress, Greenwich, Hickory Ground, Kempsville, Land, London Bridge, Oceans, Pleasant Ridge, Princess Anne C. H., Pungo and Rosemont, Va. Combination rates to apply.

12357. Establish 45c cwt.—**mineral wool (rock or slag wool)**, plain or saturated, loose or in packages, C. L., min. 24,000 lb. Subject Rule 34 Western Classn.—Rockdale, Tenn., to Kansas City, Mo.

12370. Establish 95c net ton—**sand**, C. L., (See Note 3), Goldsboro, N. C., to Four Mile, N. C. Truck competitive. Expires December 31, 1936.

12380. Publish **specific** rates on **asphaltic limestone** from Cherokee, Colrock and Margerum, Ala., to base points listed in S. F. T. B. Sou. Group Basis Tariff 700. Rates to be predicated on Docket 17805 single line, joint line or relief line scales, observing distance from each origin.

12413. Establish 602c gross ton, not subject to emergency charges, **barytes, crude, lump or jigged** (See Note 2), C. L., Piper, Ala., to Aquashicola, Palmerton, Palmerton (Delaware Ave), and Palmerton (East), Penn.

12422. Cancel, as obsolete, rates on **stone, crushed, rubble or broken**, Pounding Mill, Va., to Sou. Ry stations Benhams, Va., to Duffield, Va. Combination rates to apply.

12436. Establish 550c gross ton, **barytes ore, crude (not ground), lump, jigged or crushed, not bleached or chemically treated**, C. L., (See Note 2), but not less than 80,000 lb., Jamestown, Tenn., to Grafton, W. Va.

12463. Establish following rates cwt. on **limestone**, rough blocks, rough quarried, min. 50,000 lb., C. L.: From—Isbell, Rockwood and Russellville, Ala., to Boston, Mass., 43c; New York, N. Y., 38c; Philadelphia, Penn., 36c; Baltimore, Md., 34c; Washington, D. C., 33c.

12485. Establish rate 250c net ton on **mica**, crude, scrap or waste, suitable grinding purposes only, C. L., min. 60,000 lb. Rocky Mount to Richmond and South Richmond, Va.

Western

D-41-175. Minimum weights, **rock**, bituminous, asphalt, C. L., from stations in Kansas and Missouri, to points in Western Trunk Line Committee territory. Proposed 80,000 lb.

D-41-176. **Sand and/or gravel**, straight or mixed carloads, (See Note 1), except that when car is loaded to full visible capacity actual weight will govern, from Pueblo, Colo., and Dodge City, Kan., to Pritchett, Colo. Rates in cents per 2,000 lb.: From Pueblo, Colo.: Proposed—280. From Dodge City, Kan.. Proposed—180.

D-41-178. Cancel, account obsolete, **rock**, gypsum, C. L., from Ft. Dodge, Ia., group to Gordon and Solon Springs, Wis.

D-41-179. Cancel, account obsolete, **stone**, C. L., from Keokuk,, McManus, Montrose and Swank, Ia., in Items 3540, 6150, 6160, 6210 and 6220 of W. T. L. Tariff 50-O, to points in the above items; also Carrollton, Mo.

E-25-43—Cancel as obsolete rates on **gypsum grits**, C. L., in Item 435 of C. B. & Q. R. R. Tariff No. 9500-I. From Centerville, Ia. To Sioux City, Ia.

D-43-27. **Stone, marble** and **granite**, from Sacred Heart, Ortonville, Minn., and Milbank, S. D., to various destinations in Iowa, Missouri, Kansas, Nebraska, etc., and points taking same rates. Proposed—Same rates as apply from St. Cloud, Minn., and Group 4 to certain points.

D-43-28. **Stone**, as in Item 6800, W. T. L. Tariff 18N. From Cold Springs, Rockville, St. Cloud and Sauk Rapids, Minn. To Lindsborg and McPherson, Kan., proposed, 55c per 100 lb.

Southwestern

8870. **Agricultural limestone**, to stations in Missouri. To amend Item 500-B of W. T. L. Tariff 91-G, also Item 1150-A of Mo. Pac. Tariff 6172-F, to include Annapolis, Mo., as a point of origin, in order to permit application of distance scales of rates.

8991. To publish a 30c per ton rate on **limestone**, C. L., from Marble City, Okla., to Sallisaw, Okla., there to be ground and reshipped to points in Southwest.

8999. Establish rate of $4.60 per net ton of 2000 lb. on **feldspar**, C. L., from Kingsland, Llano and Fredericksburg, Tex., to Ada, Blackwell, Bristow, Henryetta, Muskogee, Okmulgee, Poteau, Sand Springs, Sapulpa, Tulsa, Okla., Ft. Smith and South Ft. Smith, Ark., at min. wt. 50,000 lb.

9001. To establish rate of 510c per ton of 2000 lb. on **fluorspar**, C. L., min. wt. 80,000 lb., from Buena Vista and Salida, Colo., to Sand Springs, Okla.
CENTRAL ....

Illinois

8314. **Sand**, moulding (consisting of sand mixed with not to exceed 15% clay), C. L., (See Note 3), but not less than 60,000 lb. from Goose Lake, Ill., to Chicago, Ill. Proposed—80, single line application; 110, joint line application.

Transcontinental

18632. **Crushed stone chips**. To establish C. L. rate $7 per ton of 2,000 lb. minimum weight 40 tons, from Canon City, Colo., to Pacific coast points.

I.C.C. Decisions

27110, Ingram-Richardson Manufacturing Co. vs. Black Mountain Railway Co. et al. By division 3. Dismissed. Rates, **ground feldspar,** Burnsville and Minpro, N. C., to Frankfort, Ind., not unreasonable.

16216, Cement to central territory. By division 2. Authority granted to establish minimum 50,000 lb. from Northampton, Penn., and other points in the Lehigh district, also York, Penn., and points intermediate thereto from which said rates are maintained as maxima, to points in C. F. A. territory, and extended zone C in Wisconsin, the lowest rates that may be constructed over any route, on basis set forth in an appendix to report and to maintain higher rates to intermediate points, subject to conditions as to the rates not exceeding the lowest combination of rates and that the relief shall not apply to circuitous routes more than 50% longer than the shortest tariff route from and to the same points. The appendix referred to sets forth a scale of rates beginning with 7.5c for 15 miles and less and running out with 30c for 1,000 and less and over 970 miles.

16227, lime to the southwest. By division 2. Authority granted in 12445 to establish rates from points in southwestern, western trunk line, Illinois, central and southern territories to points in Arkansas, Louisiana, Oklahoma, Texas, and New Mexico, and to Memphis, Tenn., Natchez and Vicksburg, Miss., the lowest that may be constructed over any line between such points on the basis prescribed without regard to the long-and-short haul part of section 4. The relief is subject to 33⅓, 50 and 70% circuity limitation.

16009, lime to lower Mississippi River Crossings. By division 2. Authority granted in 12447 to establish rates over existing routes, from Hannibal and St. Louis, Mo., and points grouped therewith, including Mosher and Ste. Genevieve, Mo., to Memphis, Tenn., and Mississippi River crossings south thereof and from intermediate points the same as those in effect over routes operating for the most part east of the Mississippi River, without observing the long-short-haul part of section 4. Authority to establish rates from Johnsons and Limedale, Ark., and points in the Springfield, Mo., group to the same destinations, denied.

A rate of 95c on sand, gravel, and crushed stone from Columbia, Kathwood pit and Dixiana, S. C., to Charleston, S. C., was authorized by the I.C.C. August 12.

The I.C.C. authorized Southern carriers August 11 to establish rates on phosphate, sand and clay, in open top cars, from producing points in Florida to destinations in southern territory without observing long-and-short-haul provisions.

The I. C. C. recently authorized establishment of cement rates without observing long-and-short-haul provisions from Kenova, W. Va., to Jersey City, Newark and Trenton, N. J., Albany, Binghamton, Brooklyn, New York, Rochester and Syracuse, N. Y., and Harrisburg, Scranton and Philadelphia, Penn.; and from certain points in the Mid-West to destinations in Eastern territory; to establish rates, 80,000 lb. minimum, from cement producing points in Alabama, Georgia and Tennessee to Miami, Fla., without observing the long-and-short haul part of section 4.

Lime Producers' Forum

Conducted by Victor J. Azbe,

Consulting Engineer, St. Louis, Mo.

Small Lime Kilns and Plants

LETTERS often are received asking for advice on how to build a small plant to make lime from stone one may have available. Capacities pitifully small, down to as little as just a few tons. Invariably the inquirers know nothing about lime manufacturing, its cost and marketing, and almost always they dream of large profits. As many larger plants have difficulties of making ends meet, how could one innocent of any knowledge at all, with a kiln of possibly 5 or 10 ton capacity, expect to operate at a profit? Therefore, such inquiries are always either answered bluntly or somehow dodged, as the purpose of this Forum certainly is not to lead the uninitiated into an almost certain monetary loss; neither is it to foist more producers on to an industry that has too many now.

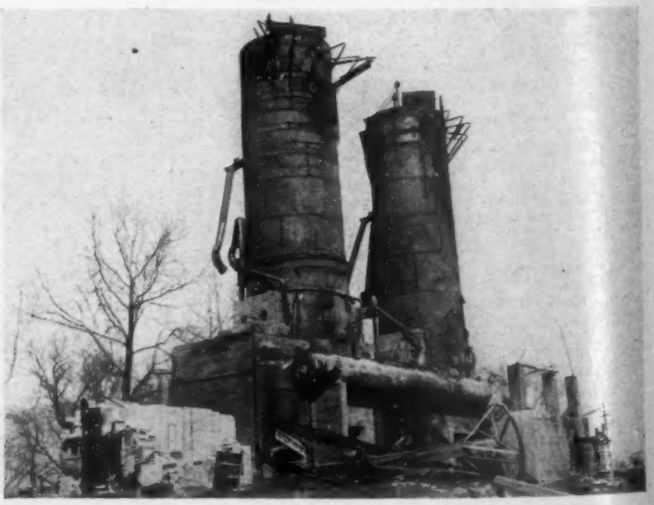
Sometimes, somehow, however, small kilns and small plants are built, and as an example, two pictures of two such kilns are shown. For the good of the industry, neither is operating as neither could on such a small scale, and from appearances quite necessary inefficient conditions, justify operation. There are sections where even long existent plants are being discarded, not being able to compete with the aggressive policies of more progressive plants. "Survival of the fittest" is as much a law in the lime industry as it is in anything else, and judgment eventually will be passed on all not proving their fitness—whether they be large or small.

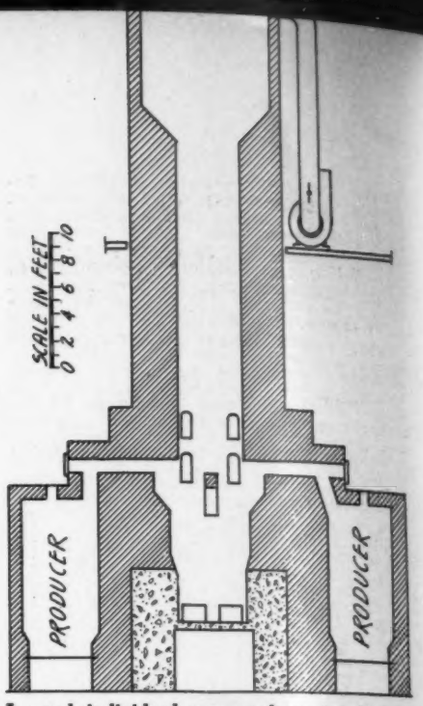
Fire Hazard in Lime Plants

And while we are warning, we may as well show the third picture, which shows a lime plant destroyed by fire. Lime plants, particularly producer gas fired plants, should be truly fireproof. Fire in direct fired plants is somewhat less likely, while natural gas fired plants are the safest. Mixed-feed kiln plants also are quite safe except, of course, in danger from other sources than the fuel used. Induced draft fans may be a source of fire when circulating extremely hot gases. It is best that induced draft piping never enters the building if this is of wooden construction.

Secondary combustion may be the cause of fire, caused by too heavy a fuel charge, with air insufficient to burn the gas generated, which on striking the air at the top of kiln charge, ignites and burns. It is this secondary combustion that is responsible for the high flame one sees occasionally on top of lime kilns. It often destroys induced draft fans and may readily cause a fire in such plants.

Photos of three obsolete plants. The one at the lower right was destroyed by fire





A good individual gas producer installation

Inquiry: *Would you furnish us some data on independent gas producers as built on each side of lime kiln, or put us in touch with someone? We want to try same on one kiln.*

Answer: The best individual gas producer installation known to the writer is presented here in sketch form. The producer grate area was based for a gasification rate of 7 lb. of coal per square foot per hour. Kiln output was over 20 tons per hour on natural draft and considerably more with induced draft. The producer was not blown but operated on the natural draft principle, which was made possible by its great height and large grate area. Steam was only used to soften the clinker just before drawing the ashes. Air for combustion of producer gas entered through the cooler. The installation was quite successful.

It is, however, only proper to mention that a greatly improved method of individual producer operation is in the state of development—cheaper to install and simpler and more satisfactory to operate. It seems when it becomes generally available that the many direct-fired furnaces now on lime kilns will rapidly disappear, which will be a great step ahead for the lime producing industry.

Bids Received and Contracts Let

Morris, Ill.: Charles Treasure, Gardner, Ill., awarded contract for 14,995 cu. yd. of road gravel at $1.09 per cu. yd. delivered from Churchill Gravel Co. pit.

• • •

Monmouth, Ill.: Low bidders for county road gravel, delivered at convenient unloading places, county to do its own hauling and spreading, were

Section 27—Kelly township—Western Sand & Gravel Co., 90c a ton.

Section 30—Berwick south—McGrath Sand & Gravel Co., $1 a ton.

Section 31—Point Pleasant township—Moline Consumers Co., 90c a ton.

Section 32—Swan township—Moline Consumers Co., 90c a ton.

Section 33—Roseville township—Moline Consumers Co., 90c a ton.

Section 35—Alexis South—Western Sand & Gravel Co., 98c a ton.

Section 36—Mosher Cemetery Road—McGrath Sand & Gravel Co., 98c a ton.

Section 37—Gerlaw east to Cemetery—Western Sand & Gravel Co., 98c a ton.

Greenbush town hall section—Western Sand & Gravel Co., 90c a ton.

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Toledo, Ohio: City offered crushed stone by France Stone Co. at 65c per ton, f.o.b. plant if WPA labor were used. Competitive bids without WPA labor ranged upward from $1.25 per ton.

• • •

Glasford, Ill.: Timber township opened bids for two graveling contracts: Chas. Swords, $1.48 per cu. yd. for 22 miles of road; Swords & McDougal, $1.56 per cu. yd. on the same job.

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Lincoln, Neb.: Platte Valley Construction Co., Grand Island, low bidder on 2000 cu. yd. of gravel for state highway detours at 97c per cu. yd. This is 25% lower than bids rejected 10 days before.

• • •

Chattanooga, Tenn.: TVA awarded contract for 22,000 tons of graded sand for Chickamauga dam to Consolidated Gravel Co., Columbus, Ga., for approximately $5,900 or 27c per ton.

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Gaffney, S. C.: Spartanburg county awarded crushed stone contracts for 22,505 tons to Campbell Limestone Co., Gaffney, for $65,662 or about $2.90 per ton; 7855 tons to Carolina Granite Co., Blairs, for $23,172, or about $2.90 per ton.

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Marion, Ohio: City received bids on 3500 tons of crushed limestone for sewage filters; Ohio Blue Limestone Co., Marion Stone Co., Hamilton Quarry submitted identical bids of $1.50 per ton.

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Quincy, Ill.: Missouri Gravel Co. successful bidder for 4940 cu. yd. of road gravel at $1.78 per cu. yd.

Insurance Carriers Act

National Council on Compensation Insurance is distributing to carriers operating in Illinois rates and regulations carrying out provisions of the Illinois workmen's occupational diseases act which becomes effective October 1. Suggested forms of endorsement are to be distributed as soon as they are available.

The rules, it is stated, "which provide for the treatment of occupational disease coverage in the state of Illinois, are applicable to all classifications in the manual, including the private residence and vessel classifications. The rules in the manual supplement—'Treatment of Occupational Diseases'—are not applicable in the state of Illinois and these rules, effective October 1, 1936, concurrently with the introduction of the workmen's occupational disease act, supersede all previous rules in connection with treatment of occupational diseases in the state."

Full coverage under the Illinois act will be provided by appropriate endorsement of the standard workmen's compensation and employers' liability policy. A policy so endorsed also provides limited protection for claims arising from occupational disease to the extent of $5,000 on account of any one employe and $25,000 on account of all occupational disease suffered during the term of the policy, not exceeding twelve months.

A second form of coverage may be provided but only if the policy includes a classification designated on the occupational disease rate sheet by the symbol S (silicosis) or ASB (asbestosis). In this form of coverage the employer obligates himself to participate in the loss on each occupational disease claim covered to the extent of 50 per cent, subject to a maximum liability on the part of the employer of $1,000 for each case. Such coverage shall be provided only by specific endorsement.

It is provided that a supplemental occupational disease loading may be added to the normal rate for any individual risk where the occupational disease hazard is abnormal. The occupational disease minimum premium is $5.

New Plant

LeGrand Limestone Co., Sioux Rapids, Ia., has leased 30 acres to build and operate a sand and gravel plant on the Chicago & Northwestern Ry. A. J. Schneidermeyer is production engineer in charge.

New Plant

Jackson Limestone Quarry, Inc., Jackson, Mich., is the name of a new enterprise of which J. P. Dunigan, contractor and state highway department engineer, is president. A quarry and crushing plant is to be operated on the Clark farm, five miles north of Jackson. Agricultural limestone and aggregate will be produced.

Sand-Lime Brick Production and Shipments

THE FOLLOWING DATA are compiled from reports received direct from producers of sand-lime brick located in various parts of the United States and Canada.

Ten active sand-lime brick plants reported for the month of July, this number being one less than that reporting for the month of June, statistics for which were published in August.

Average Prices for July

Shipping Point	Plant Price	Delivered
Pontiac, Mich.	$11.00	$14.00
Grand Rapids, Mich.	10.50	.....
Detroit, Mich.	....	13.50
Mishawaka, Ind.	9.25	.....
Syracuse, N. Y.	14.00	16.00-20.00
Saginaw, Mich.	10.50	.....
Sioux Falls, S. D.	....	13.50
Toronto, Ont., Can.	12.00	13.50

Statistics for June and July

	June†	July*
Production	3,689,615	3,427,225
Shipments (rail)	264,050	197,000
Shipments (truck)	3,234,710	2,896,015
Stocks on hand	1,339,696	1,811,768
Unfilled orders	2,945,000	2,100,000

† Eleven plants reporting; incomplete, two not reporting unfilled orders.

* Ten plants reporting; incomplete, three not reporting unfilled orders.

Sand-Lime Block

One producer reported production of 21,530 sand-lime block of various sizes in July, with truck shipments aggregating 14,045. The average price of the block was 11c F.O.B. plant, and 13c F.O.B. job.

Awarded Construction Contracts

Evidence is that more and more producers of aggregates are taking construction contracts:

Brookfield Quarry Co., Astoria, Wash., has been awarded a $45,234 highway construction job.

Concho Sand and Gravel Co., Oklahoma City, Okla., has been awarded a highway surfacing contract.

Independent Gravel Co., Joplin, Mo., has been awarded a city asphalt paving job.

Curtis Logsdon Sand and Gravel Co., Lewistown, Ill., has received a contract to drive piling for the new river terminal of the C. and I. M. R. R.

American Aggregates Corp., Greenville, Ohio, has been awarded a U. S. War Department contract for $480,184 for dredging the Alton pool, Illinois waterway.

Strike Ends

Portland, Ore.: Sand and gravel producers have resumed production and deliveries after shut down resulting from a strike of few weeks' duration of some of their truck drivers. They returned to work on the same basis on which they were employed before the strike and shutdown started, it is said, pending a decision in the controversy by representatives of the employers and the building trades council.

Cement Products

Special Pipe Units Sold for Municipal Sewage Disposal Plants

THE Yancey Concrete Products Co., of Atlanta, Georgia, has for years been one of the progressive products manufacturing concerns of the south, and as such is always on the lookout for new fields in which its products may be used. The company manufactures pipe as its chief product and a few years ago developed a special type of pipe for use in the bottom of filter beds of sewage disposal plants.

After considerable time spent in testing this new product, both in the laboratory and in actual use in disposal units, the opinion of the company and of users is that a wholly satisfactory product has been developed. The new unit is said to compare very favorably with the ceramic and metallic units that have generally been used for this work, both as to strength and cost of production.

Construction

Filter bed pipe must be made strong enough to bear the weight of the filtering material in the bed, and this material is usually four to six ft. in thickness. Since the pipe is perforated to allow the filter effluent to enter and be drawn off, extra strength must be built into the pipe to counteract the loss in strength due to the holes.

The filter units built by the Yancey company are six-in. pipe with two rows of square holes placed at about 90 degrees from each other. The holes are spaced about two in. apart and between the holes are circular ribs to increase the strength of the pipe. The units are of the bell-and-spigot type. One of the accompanying illustrations shows clearly the shape and size of the filter pipes and illustrates the method of installation.

Considerable testing was necessary before a satisfactory design for the filter pipe was obtained. The work was done by the Pittsburg Testing Laboratory, and also some tests were made by the Georgia State Highway Dept. The unit finally decided upon was as described above and was made of a 1-3 mix of cement and sand.

In installing these units, the pipe is laid to grade in the filter bed and then partially covered so only the two rows of inlet holes remain exposed. This increases the supporting capacity of the pipe and at the same time eliminates the possibility of stagnant effluent in the bottom of the bed, lower than the inlet holes. One of the illustrations shows the installation of these units at the sewage disposal plant of Hopeville, Ga., a suburb of Atlanta. This particular job was completed in the summer of 1931, under the direction of Robert and Company, engineers of Atlanta.

A recent report from the engineers on this particular installation states that after five years of use the units are in excellent condition and that replacements have not been necessary during that time. The same results have been obtained with Yancey units by Robert and Company in similar installations completed since the Hopeville job was done.

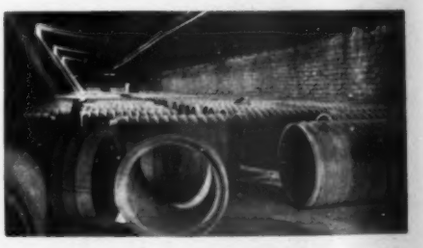
The Plant

The Yancey company operates a large plant at the south end of Atlanta. The equipment is located on one level in one large room, although the cement and aggregate are brought into the room on an overhead platform so they can be easily charged to the mixers. There are two Besser mixers, each equipped with an elevator to raise the mixed concrete to the pipe machines.

One mixer feeds to a No. 206 heavy-duty Quinn pipe machine which turns out the larger size of pipe for the plant. The other mixer furnishes material to a McCracken concrete pipe machine, which is driven by an electric motor through a Link-Belt silent chain drive. The McCracken machine is used for the smaller sizes of pipe and will make three sections at a time.

The smaller pipe is moved from the machines to the kilns by two-wheeled, rubber-tired carts, and the larger sizes by four-wheeled dolleys. There are five kilns, each equipped with a sheet-metal door at the outer end and a heavy canvas curtain at the inner end. The kilns are fitted so the pipe can be cured with steam or under a spray of water, but at present only the latter method is being used. There are two pipes running along the roof of each kiln, fitted with nozzles for the distribution of water or

The kilns and part of the storage yard of Yancey Concrete Products Co.



Interior of one of the kilns

Left: Storage yard and plant of Yancey Concrete Products Co. Right: Equipment for the manufacture of large and small pipe

Installation of perforated concrete pipe in sewage disposal bed at Hopeville, Ga.

steam over the pipe in the kiln. In general it has been found advisable to stop operation in the plant during freezing weather instead of going to the expense of providing steam curing, since at Atlanta there are relatively few days when the temperature will fall below the freezing point.

Storage

After curing, the pipe is stored in a large storage yard adjacent to the plant. Here a large stock is maintained, as the company has found it economical to operate three or four months on one particular type of pipe, before changing to another type, so this requires ample stock on hand. Shipment is made largely by rail, although local orders are trucked out from the plant. For some time the Yancey plant has been furnishing large quantities of corrugated concrete pipe to the city of Atlanta in sizes up to 30-in. pipe.

Shipping

The rail siding, which is used for shipping out the pipe, is also used to bring in the required materials. Sand and grits come directly to the plant by rail from Montgomery, Alabama and are unloaded to bins for storage until used. Cement is brought in the same manner, and also some crushed stone is shipped in. As the siding is on a high level at the plant, this material can readily be unloaded to bins where it can be used in the mixer without much handling. Negro labor is used for this work, and is also largely used in the operation of the machines in the plant.

Wire mesh reinforcing is brought in by rail for use in the larger sizes of pipe. The reinforcing is spot welded in its circular shape with a Taylor-Winfield welder.

New Kiln

United States Lime Products Corp., San Francisco, Calif., is erecting a $40,000 kiln at its South Sonora, Calif., plant.

Producing to Capacity

Peerless Cement Products Co., Charlestown, W. Va., after operating since 1929 at around 10% of capacity is reported to be operating at capacity. Elias Fellabaum, president, is contemplating additional equipment. Cinder-concrete building blocks are the chief products.

Ready-Mix Concrete Added

Andersen Sand and Gravel Co., Saginaw, Mich., is building a ready-mixed concrete plant at Baum and Atwater streets.

New Plant

Kirkham Concrete Products Co., Topeka, Kan., has recently placed in production a new modern plant at 605 North Tyler St. The equipment includes a 60-cu. ft mixer, and a Besser automatic stripper of a capacity of 3600 standard 8x8x16 in. blocks per day, or 36,000 brick.

Paving Blocks Coming Back

Wisconsin Granite Co., Chicago, Ill., is reported to have an order for 50,000 granite paving blocks for the city of Chicago, to be produced at its Redgranite, Wis., quarry, in addition to another order requiring three or more carloads a week.

Right Coupling Saves Plant

Ray & Son, Louisiana, Mo., sand and gravel plant was probably saved from destruction by fire recently because the equipment of the plant included a pump with connection for a fire-hose coupling which corresponded in size with the hose used by town's fire department—2½-in. diameter. The fire started from an oxy-acetylene torch but after fire-hose connection was made the fire fighters made excellent progress and succeeded in putting out the fire after fighting more than two hours. The fire was west of the principal buildings of the plant. Plant hands assisted the fire department.

Quarry Project

Minneapolis and St. Louis R.R. is said to be contemplating development of limestone property near Humboldt, Iowa, to produce agricultural limestone and aggregates.

Granite for Porcelain

Barre, Vt.: Porcelain has been successfully made experimentally from pulverized granite, or granite dust, with the addition of china clay. The chief problem is the separation of the mica and iron. It is believed that this can be done by the frothing flotation process, as limestone impurities are removed for concentrating calcium carbonate for portland cement manufacture.

Cold Black Top Mix

Standard Paving Co., Tulsa, Okla., has recently completed and placed in operation a modern asphalt paving mixture plant to produce a cold lay product. The plant is said to represent an investment of $200,000. I. V. Gray is president; H. C. Gray, secretary and treasurer; William Holden, vice-president, materials division; J. A. Bartlett, general superintendent, and William Keiss, asphalt plant superintendent and chemist.

Use for Old Underground Workings

England: Our British contemporary *Quarry Managers' Journal* reprints from an English newspaper the following item:

There are persistent unconfirmed rumors to the effect that the War Office has purchased Pockeridge Park, Corsham, under which there are vast quarry workings, for storage purposes.

Reports concerning this development are current in the district, and it is obvious that the transaction, if carried through, will be on a big scale.

The utmost secrecy is being maintained, but it is a fact that Army officers and surveyors, as well as civil engineers, are at work in the locality. This would seem to indicate that considerable developments are imminent.

Recently it was announced that the famous Chilmark quarries, near Salisbury, had been purchased by the Air Ministry, and it is said that they will be used for storage.

The quarries above the ground comprise several acres, but there is a considerable underground cavity.

In the United States we are preparing to store our gold hoard underground in Kentucky. Maybe the numerous Pennsylvania limestone mines will serve another purpose some day, if the world continues to cultivate war.

NEW MACHINERY AND EQUIPMENT

Front view of unloader

Remote Control Cement Pump

FULLER Co., Catasauqua, Penn., announces a new improved Fuller automatic, remote control unloader for handling cement and other dry, pulverized rock products. It is claimed to have a wider field of utility, greater handling capacity, convenience, flexibility and safety of operation through remote control, simplified mechanical construction and decreased liability to accidental stoppage.

Capacities and pumping distances are said to be greatly increased, principally because the screw-shaft motor is employed solely for pumping. The maximum motor power is continuously employed with respect to volume of material and the distance of conveying. Delivery of material is maintained at a constant maximum rate by permitting the operator to force the operation, as the necessity for rearward movement, in anticipation of slides, and stoppages due to overloads are eliminated by the provision of positive means to prevent such overloads. The machine is claimed to function efficiently even though it may be buried entirely under a slide of material.

Small Shovel

NORTHWEST ENGINEERING Co., Chicago Ill., announces new models in ⅜ and ½ cu. yd. capacity convertible shovels, known as models 15 and 18, respectively.

The operating machinery is mounted on a rotating base casting of unusual design. Both base and side frames are cast as a unit, to assure maintenance of alignment of all shafts and bearings and provide a rigid frame. The crawler base is mounted on a casting and all travel gears are fully enclosed both top and bottom. Crawlers are of standard Northwest design having bronze-bushed, enclosed drive sprocket shaft bearing, roller-chain drive, with standard self-cleaning crawler tread and roller construction. Side frames are all welded.

The engine is an 8-cylinder Ford truck model with starter equipment as standard. This engine has been improved to meet the more rigorous service of shovel operation by several features that Northwest has found necessary over a period of years. Ford pumping equipment which consisted of only an impeller has been replaced by oversized water pumps. The radiator is of special double-tank capacity. The Ford transmission has been replaced by Twin Disc clutch and beyond this is a flexible coupling. A special flywheel is mounted in line with the crank shaft so that none of its torque is transmitted through the engine clutch.

The transmission is through a set of wide-faced helical gears mounted on anti-friction bearings and running in an oil-tight case. All high-speed shafts are mounted on ball or roller bearings. Standard equipment includes the "feather touch" clutch control, a Northwest device of long standing, utilizing the power of the equipment to shift the clutches. Standard equipment also includes the cushion clutch, a device on the main clutch in the hoist drum, to limit the hoist-rope pull to a definite value, transmitting

Small, convertible shovel on rotating base casting of unusual design

Cement pump which operates through remote control

the full engine power but reducing maximum stresses on every part of the machine under power when the hoist rope is tensioned.

The new models also incorporate the use of hook rollers between the rotating base and travel base. These rollers produce, it is claimed, a result which otherwise could only be obtained by doubling the diameter of the roller path.

The boom is of wide base design and is all welded. Dipper sticks are also welded. The bucket has a manganese front with removable teeth. Sheaves are of extra large size for long cable life.

Nickel Manganese Steel Bars

STULZ-SICKLES Co., Newark, N. J., has developed a line of nickel manganese applicator bars in sizes 5/16 to 2 in. diameter, also flats and squares for reclaiming worn-down and ordinarily discarded machine parts.

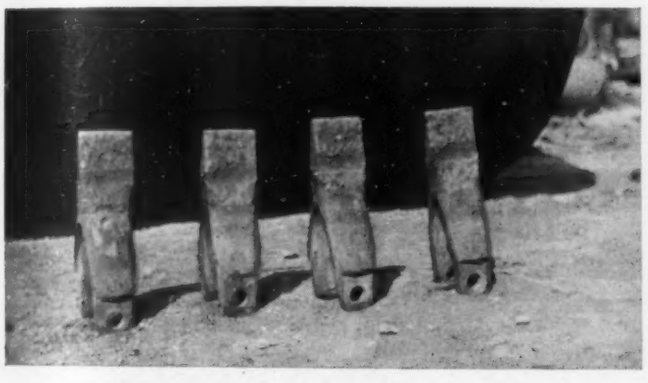
With the use of nickel manganese steel in the form of a welding electrode important economies were effected by reclaiming these parts entirely by the bead-by-bead method, but since the development of nickel manganese steel applicator bars and wedge bars, it is now possible to replace large amounts of metal much faster and more economically than by the usual bead-by-bead practice. While a part can be rebuilt and reclaimed cheaper than the price of a new one the largest economy in keeping up this type of equipment to its normal size is found in better digging, better crushing and less handling.

Nickel manganese steel applicator bars and flats and squares should be applied only with nickel manganese steel weld deposit, preferably made with a bare nickel manganese steel welding electrode. The best practice when applying applicator bars is to run a heavy bead, in order to anchor them; spaced far enough apart so that both sides can be welded and spaces in between filled with deposited metal.

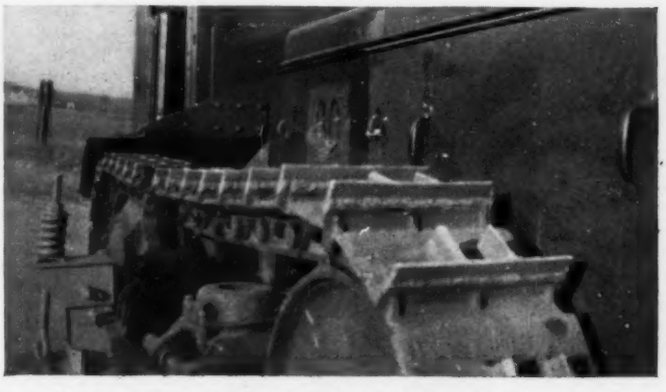
Due to the fact that all 11 to 14% manganese steel castings are heat-treated and water-quenched prior to being shipped out of the foundries, it is most important to keep the parent metal from becoming overheated during the welding operation. Therefore, it is advisable to skip from place to place on the part, otherwise it may become overheated which causes the removal of this heat treatment that has been put into the casting originally. Under no circumstance should weld deposits of nickel manganese steel be water quenched, as this may cause small hair line cracks and consequent failure. Nickel manganese steel applicator bars, wedge bars and welding electrodes are all air toughening and the use of heavily coated electrodes is not recommended, due to the fact that this heavy coating deposits a heavy slag over the deposited metal and consequently the air is excluded.

The growing use of nickel manganese steel applicator bars and wedge bars is greatly increasing the efficiency of equipment used in the material handling industry, as in the case of shovel and dipper teeth. The worst wear on a shovel or dipper tooth

Repaired gyratory bell and liner

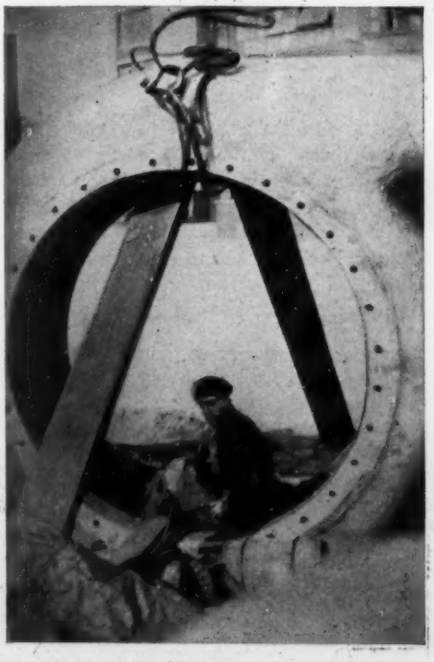


Nickel manganese steel wedges for repointing



Grousers for caterpillar treads of nickel manganese steel

Wedge attached to dipper tooth



Rebuilt manganese steel pump shell

is the first wear, due to the fact that manganese steel is only tough and not hard and it work-hardens from impact and abrasion and until such time as the shovel tooth work-hardens there is a considerable loss of metal.

Originally, when wedge bars were first developed, the greatest demand was for wedges 4 to 5 in. long, but since the operators of shovel equipment have recognized the great economies obtainable due to welding, the demand now is for 2- to 3-in. long wedges and it is apparent that the operators are now removing dipper teeth and sending them to their welding departments for reclaiming when only a small portion of the tooth has been worn away.

Prior to 1928 it was considered impossible to satisfactorily weld 11 to 14% manganese steel crusher plates, gyratory crushers, pump shells, impellers, etc., and these parts were operated at a very low efficiency during the greater part of their life, whereas under today's conditions the company which operates a crusher plate finds it more economical to rebuild the corrugations when they show slight wear than to use a crusher plate low in efficiency that overloads not only the secondary crusher, but the screens, conveyors and other equipment.

Several of the large cement companies, most of which were once hesitant about reclaiming these parts, not only repair their shovel equipment, but in some instances are rebuilding their cement mill hammers and liners.

The pictures on page 69 cover a number of parts and illustrate how the attaching of nickel manganese steel in the form of applicator and wedge bars permits of large amounts of metal being applied rapidly and at a low cost. The most important part, however, in the reclaiming of parts of this kind is that the part can be kept up to its normal size and low costs obtained, at very little expense for the welding operation.

Blade Mill

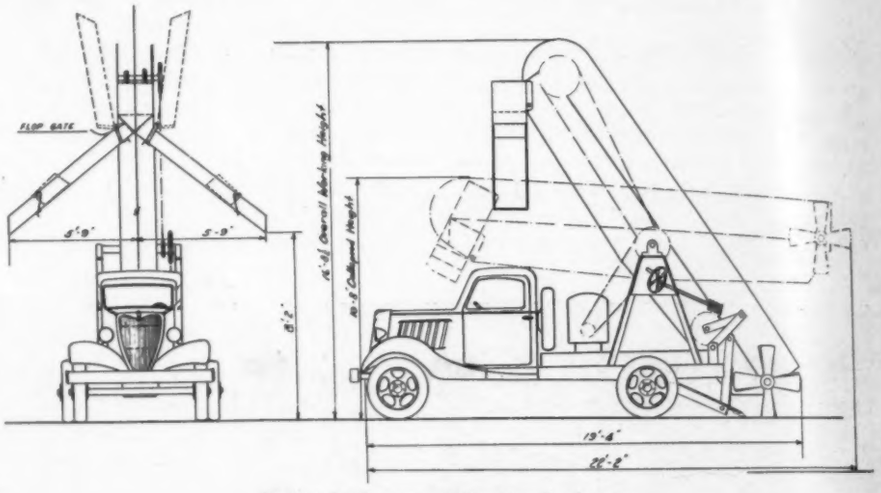
Allis-Chalmers Manufacturing Co., Milwaukee, Wis., recently brought out a new piece of equipment known as a blade mill. It is a special development for washing, disintegrating, and cleaning ores, stone and other products containing a large amount of clay, slime, or other materials that are detrimental to subsequent processes of treatment. The inner periphery of the mill is provided with a series of quick-removable log washer type teeth arranged for angular adjustment on special bases to which the teeth are attached. The disintegration is effected by combined cutting and rolling action in water within the mill. It is said to have a much wider application than the conventional log washer, as it can handle material up to 12 in. or larger in size. The mill is arranged for variable speed and variable pulp level. The combination of angular adjustment of blades, with variable depth of pulp and speed, provides unusual flexibility. It has a wide range of adaptability both for the treatment of ores and in the aggregates industry.

Left—Mill for washing, disintegrating and cleaning rock products

Bucket Loader

George Haiss Manufacturing Co., New York City, announces a new bucket loader mounted on a motor truck chassis. Its chief distinction is naturally increased mobility. Power for operating the buckets and self-feeding device is provided by a 20-hp. industrial type gasoline engine. Movement into the pile is accomplished by the reverse traction drive of the truck. The rated loading capacity is 1½ to 2 cu. yd. per min.

The principal dimen ions, both in use and folded for transpo tation, are shown below.



Bucket loader mounted on truck chassis

Portable Compressor

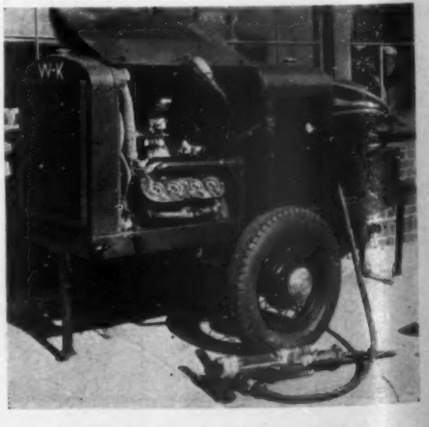
Wenzel-Kenny Machinery Co., Kansas City, Mo., is placing on the market a new type portable air compressor made in three sizes and styles. One of these compressors uses two V-8 Ford motors, with two patented "air heads" on one engine, connected with Twin Disc clutch to another V-8 motor used for power. A second type uses one bank of motor for power and the other bank as a compressor (four cylinders on air and four as an engine). A third style is designed to produce 50 to 70 cu. ft. of air per min. for operating a single jackhammer or other similar tool.

One advantage claimed for the W-K combined engine compressor is trade-in agreement of the Ford Motor Co. which permits a user to turn in a used motor and $50 to get a new one. It is claimed air heads and valves which convert the motor to an air compressor do not wear appreciably.

Light Wagon Drill

Ingersoll-Rand Co., Phillipsburg, N. J., announces a new light-weight wagon mounting for fast and powerful rock drills, to fill the gap between the large I-R drills and the handheld Jackhamer. It will handle 20-ft. steels and will accommodate a 6-ft. steel change.

The new unit has a positive feed at any angle. Feed is by air-motor, with an infinite range of feed pressure from 1 to 1000 lb. A self-locking worm drive permits feeding the drill up to the rock exactly as with a hand-cranked drill—said to be a distinct advance in the method of feeding drills on wagon-drill service. The new mounting



Combined engine-compressor

provides an easier and faster method of handling the heavier drills, resulting in increased yardage with less fatigue to the operator. The mounting can be equipped with pneumatic tires which make it much easier to move or transport.

Mounting for fast rock drill

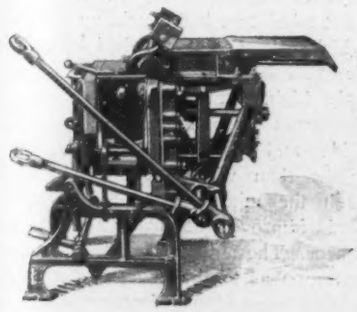
Water Meter

SPANGLER MANUFACTURING CO., Los Angeles, Calif., announces the Spangler "Metering Valve" which automatically measures water to a guaranteed accuracy within 1%. This is a compact, self-contained unit which can be quickly and easily installed on any concrete mixer. It is automatic in operation and permits positive and convenient changing of the delivery volume by simply setting the dial to the desired amount.

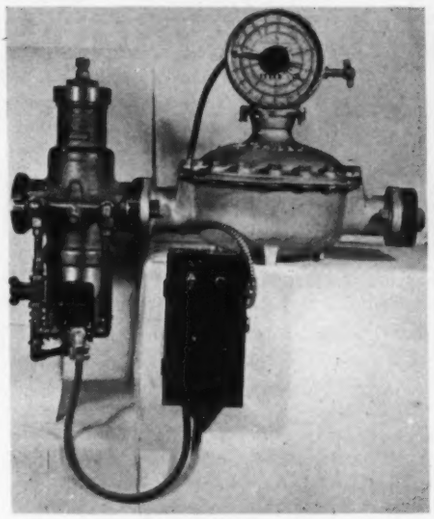
The accuracy of measurement is secured by mechanically proportioning the hydraulic displacement in the valve and calibrating the meter in the factory laboratory. Changes in the amounts of water delivered per batch of concrete are made by setting a dial which changes the speed of displacement. This in turn changes the quantity of water delivered.

Concrete Block Machine

MILES MANUFACTURING CO., Jackson, Mich., has brought out a new machine for manufacture of multiple, concrete random ashlar masonry units, at what is claimed to be one-third of the former cost. The block is a standard 8-x8-x16-in. size, the face having deep ridges which are pointed by the mason as laid, giving the appearance of random ashlar.



Ashlar block machine



Automatic water meter

Dredging Pumps

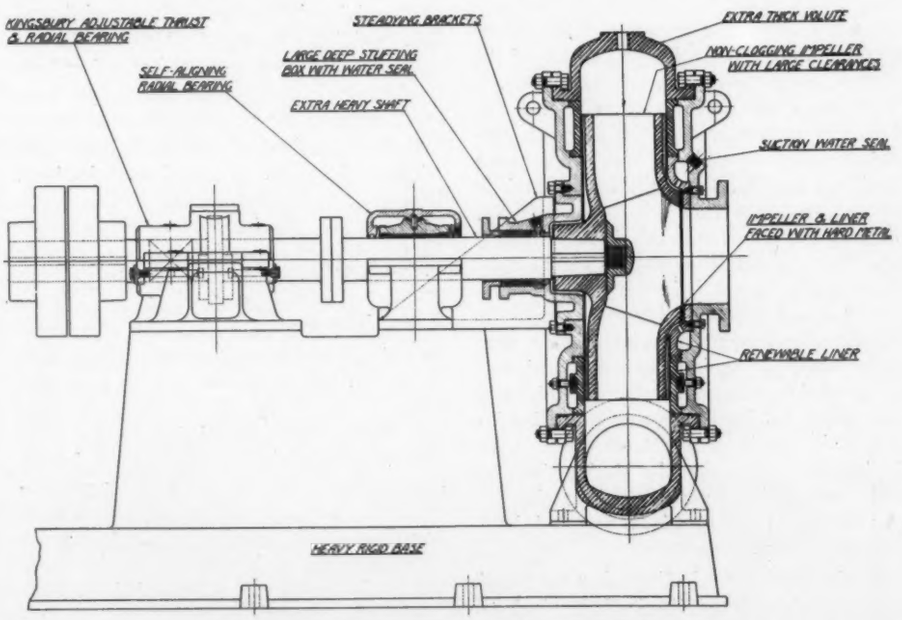
LAWRENCE MACHINE AND PUMP CORP., Lawrence, Mass., has developed a line of heavy-duty dredging pumps for sand and gravel operations. These pumps are made with extra large clearances and are especially adapted for dredging deposits containing coarse gravel and boulders. They are made in all sizes from 6 in. up, and they are suitable for heads up to 200 ft. They are for belt drive, direct connection to electric motor, gasoline engine or Diesel engine.

The shell is very heavy and is fitted with discs on both sides lined with renewable liners. The wearing parts are of simple construction, are easily renewable and can be furnished of manganese steel or other alloys.

A special feature of these pumps is the Kingsbury thrust bearing and the self-aligning steady bearing, which type of construction was used, until now, only on the largest and most expensive pumps.

To prevent wear between the impeller and the disc liners the impeller and the liner are faced with hard metal where they form a running joint. In addition, to give further protection against wear, a water seal is provided by introducing clear water from an independent source into the water chamber on the suction disc.

Application is being made for patents to cover the special features of this new line of pumps.



Heavy-duty dredging pump for sand and gravel operations

How units made on ashlar block machine are applied

Digest of Foreign Literature

By F. O. Anderegg,
Consulting Specialist in Building Materials, Newark, Ohio

High Early Strength Concrete with Portland Cement. The great increase in cement strength obtainable in the laboratory within the past few years has outstripped concrete design, and engineers have been somewhat at a loss to know how to take advantage of this potential strength in designing concrete structures. Recently this has often led to designs calling for factors of safety of the order of 25, which seems somewhat wasteful of material. To take care of this situation, M. Freyssinet, whose "Novel Ideas and Views" was discussed in Rock Products (1933) No. 3, p. 44, March 25, has worked out a combination process which not only develops strengths as high as any obtainable in the laboratory heretofore, but has even obtained values far beyond anything so far obtained in commercial concrete and at a tremendous speed. Thus in two hours he secures compressive strengths above 5000 lb. sq. in. and 20,000 in a few days. Such results are obtainable by using high quality cement, clean well graded aggregates of the highest compressive strength obtainable, a very low water-cement ratio, vibration followed by compression of the concrete, curing the concrete under a high compression load as was described previously, and in addition, a steam curing at about 210 deg. F. with the aid of steam jackets. The natural heat of the hydration of the modern, high quality cements, in the presence of a rather small amount of water, results in considerable temperature rise so that very little steam is required and the hardening is speeded up tremendously. In this way Freyssinet has been very successful, for instance, in repairing structures which were in danger of collapsing, by placing the concrete and curing in a very short time *in situ* so that loads could be assumed in a matter of hours.

In the earlier work Freyssinet proposed to use steel with an elastic limit of about 100,000 lb. sq. in., but now he has found that by hardening and annealing, followed by further cold working, elastic limits may be raised to 185,000 or 198,000 lb. sq. in. at a cost of about $2 a ton, which would mean that the ratio cost-elastic limit may be reduced to about one-fifth its present value as compared with steel having 34,000 elastic limit. To take advantage of this steel improvement it was necessary to raise the concrete quality to withstand the pre-stressing loads which could now be applied; hence the still more careful selection of aggregates and the steam acceleration of hardening. At the same time the modulus of elasticity is greatly increased. The pre-stressing, as was pointed out previously, induces in the concrete permanent stresses of a sign opposite to those caused by a load; where the load would place the member under tension, it is put under an initial compression and where the load effect would be one of compression, with proper design, the member is placed initially under tension. Freyssinet accomplishes the result by stretching his steel reinforcing in the forms with the aid of jacks, placing the concrete as above described, and as soon as it has reached sufficient compressive strength, the jacks are released so that most of the tension in the steel is transformed to the concrete. Obviously, it is essential to have a concrete with practically no creep, and these methods seem to give such a result.

Tests were made on telegraph poles 40 ft. long fixed to a depth of 6 ft. 7 in. from the base and subjected to alternate repeated stressing at the head of 1000 lb. Pre-stressed poles contained 110 lb. reinforcing of a total weight of 1650 lb. Ordinary reinforced poles weighed 2150 lb. of which 286 lb. was steel, and began to fissure after a few hundred reversals and broke under a few thousand, whereas the pre-stressed pole showed half the deflection and resisted 500,000 cycles without alteration. A pipe 2 ft. 6 in. long, having an inside diameter of 17 in., a wall thickness of 1⅜ in. was reinforced with bars equivalent in sectional area to a plate 1/16 in. thick, and formed according to this process, the concrete being under a compression load of 7000 lb. sq. in. This pipe began to leak at an internal pressure above 1250 lb. sq. in., but as soon as the pressure was released the cracks all closed immediately and the concrete healed itself (the autogenous healing of concrete is a well known phenomenon). Reported in a paper presented by T. J. Gueritte, a colleague of Freyssinet's, at a joint meeting of the Societe des Ingenieurs Civils de France and the Institution of Structural Engineers held in London during March. *Cement and Cement Manufacture* (1936) 9, No. 4, p. 71.

Certain Anomalies of Setting in Relation to Cement Grinding. A certain cement mill superintendent working with a new compound finishing mill found it necessary to increase his SO_3 to 1.7% in order to control the initial set of the cement, whereas in the cement ground in his old mill 1.2% was adequate. Since the cement ground in the former emerged at a temperature of 155 deg. C. he concluded the trouble to be in changing the gypsum to an insoluble form of anhydrite. But it so happened that he installed a new laboratory grinding mill, increasing the diameter of the mill and the dimensions of the balls, and found similar disturbance in his setting time, so he called in Marc Elber. The first thing they did was to put a batch in the laboratory mill and grind it steadily for 48 hours, taking samples hourly. The residue on the 176-mesh sieve dropped to 4.2% in two hours and then rose to above 22%, while the cement became a flash setter in 10 hours of grinding. Analysis of the residue on the sieve showed it to be clumps, rather high in gypsum, formed by the impacts of the fairly heavy balls used. This balling up had resulted in a marked diminution of the SO_3 available in the bulk of the cement for controlling the set. On placing some of the clumps in a mill with a very heavy ball which rolled out the clumps, rather than pounding them, Elber was able to increase the setting time quite appreciably. While realizing that this is not a very serious effect, E. has noted it in other mills and having the question raised by others he ventured to report his observations in *Revue materiaux construction travaux publics.* (1935) No. 314, p. 257.

Studies on Iron Cements. IV, V. S. Nagai and K. Nomi have prepared a number of iron cements and have found that they develop less heat, usually set free less lime during hydration, give quite good strengths and stand up very well against aggressive sulfate solutions. *J. Soc. Chem. Ind. Japan,* Suppl. Binding. (1935) 38, No. 11, p. 666B; No. 12, p. 737B.

Fineness of Cement Raw Mixtures. Y. Sanada and G. Nishi have elutriated clay ground for making portland cement and have found a definite increase in silica in the finest fractions. They also have observed that the finer the clay was ground the larger the crystals of tricalcium silicate would become in the resulting clinker. *J. Soc. Chem Ind. Japan.* Suppl. Binding (1935) 38, No 12, p. 720B.

Increased Early Strength of Cement by Means of Calcium Chloride. The addition of 0.5% of the weight of the cement as calcium chloride added to the mixing water raised the 1-, 2- and 3-day strengths of a large number of cements when tested according to the German specifications, but in varying degree. The benefit to the tensile strength, however, was not so great as compressive strengths showed. One cement rather low in lime and ground to a medium fineness showed the greatest improvement, while cements running higher in iron did not show up so well for the addition. After 7 days of storage many of the cements without admixture had caught up with those to which calcium chloride had been added, while at 28 days many without the salt gave slightly higher strengths. One high lime cement was ground with 0.5% calcium chloride and gave higher early tensile strengths than when the salt was added through the mixing water, both showing marked improvement over the salt-free specimens. The author, Des. Steiner, raises the question as to the effect of the salt in promoting corrosion of the reinforcing steel. *Zement.* (1936) 25, No. 9, p. 132.

THE INDUSTRY

New Incorporations

Jackson Limestone Quarry, Jackson, Mich. J. P. Dunigan, 1117 Francis St., is president.

Fuller's Earth Mining Co., Mayfield, Ky.; capital $15,000. Incorporators are C. D. Cosby and W. J. Watkins.

Austin Dunbrik and Tile Co., Austin, Texas; concrete products. Incorporators are H. G. Epperson and R. L. Wallac.

Nantahala Talc and Limestone Co., Andrews, N. C.; capital, $100,000. Incorporators are Percey B. Ferebee and W. T. Forsyth.

Standard Mica Co., Asheville, N. C.; capital, $100,000. Incorporators are T. B. Summer and Eugene C. Ward, Medical Bldg.

White Rock Silica Co., 435 N. Michigan Ave., Chicago, Ill.; 1000 shares no par value common. Incorporators are H. S. Haze, Sidelle Sproger and John Grant.

Mutual Lime Co. of Virginia, Inc., Winchester, Va., (H. M. Kaufmann, president), has reduced its maximum authorized capital stock from $500,000 to $100,000.

Sherman Sand and Stone Co., New Britain, Conn.; $70,000—2800 shares at $25 par. Directors are Howard T. Sherman, Robert H. Sherman and Frank C. Stocks.

Anna Quarries, Inc., 140 West 111th St., Chicago, Ill.; to deal in stone; 200 shares no par value common. Incorporators are Bernard Vellenga, John A. Benson and William M. Brinkman.

Asphaltic Limestone Co., 55 E. State St., Columbus, Ohio; to sell road improvement material as agents for the Ohio Rock Asphalt Co. of New Vienna, Ohio; 250 shares common stock of no par value but with a stated value of $2 per share. T. D. Van Camp is president; F. L. Ferguson, Wilmington, Ohio, vice-president; and George W. Van Camp, secretary-treasurer.

National Gardens Coquina Rock Co., Daytona Beach, Fla.; to quarry coquina rock from what is said to be the largest of any coquina pit in the United States. Incorporators are W. W. Sterling, F. F. Smith and L. Pfingstad.

Huron River Silica Co., South Rockwood, Monroe county, Mich.; 300,000 shares common stock. Officers are A. Tennyson Pryor, president; Hugh L. Joseph, vice-president in charge of operations; Edward C. Huebner, vice-president and fiscal manager; William F. Morgan-Dean, secretary; and Joseph W. McDougal, treasurer.

Air-O-Cel Industries, Inc., Stephenson Bldg., Detroit, Mich.; to manufacture, sell and install insulating materials including rock wool, wall board, and other products for the building industry; authorized capital 200,000 shares, of which 160,000 shares at $1 par value are outstanding. Incorporators are F. C. Reinke, L. A. Stoneman, E. J. Trinklein and Otto Trinklein.

Personals

P. Turner Scott has been named sales manager of Georgia Cement & Products Co., Atlanta, Ga.

J. M. Dannelly was recently made vice-president of the National Cement Co., Birmingham, Ala.

Herbert M. Cross has been appointed district sales manager of Pennsylvania-Dixie Cement Corp. at Philadelphia, Penn. He is assisted by **Joseph G. McCabe, Jr.** Announcement is also made of appointment of **Ernest F. Stickles** as assistant district sales manager at New York, N. Y.

Obituaries

Charles S. Sminck, 70, a former salesman for the Lawrence Portland Cement Co. of New York, died in Plainfield, N. J., August 4.

John B. Davis, until retirement three years ago secretary-treasurer of American Gypsum Co. of Pt. Clinton, Ohio, died August 15 after a short illness at his home in Cleveland, Ohio. He was 84 years old. For 35 years he had been associated with the engineering firm of J. B. Davis & Son.

Victor Piollet, former sales manager of the Washington Brick, Lime and Sewer Pipe Co., Spokane, Wash., died July 28 in Wysox, Penn., of heart failure.

Robert S. Murray, 68, former treasurer of the General Electric Co., died July 29 at his home in Schenectady, N. Y. He had been in poor health for about a year and had retired from his position May 1.

Frank S. Jones, 42, general superintendent of bituminous concrete plants of the General Crushed Stone Co., died in Easton, Penn., August 10, of acute dilatation of the heart. He had been with the company since 1922 and had just been promoted to superintendent of all bituminous plants August 3.

Otto Vorse, 37, foreman at the Northwestern Portland Cement Co.'s plant at Grotto, Wash., died July 29 of injuries received at work. He had been riding in a crane bucket while directing the moving of a grizzley when a cable parted, dropping the bucket, which landed on top of him. He had been in the company's employ for eleven years.

William Goedecke, 54, West Brighton, N. Y., sales engineer attached to the New York office of Robins Conveying Belt Co., died recently. He had been with the company for over 20 years. In the early days he was engaged in engineering work, contributing many ideas to the methods of modern material handling. In recent years he was in sales work in the East.

Frank B. Jamison, president and treasurer of the Atlanta Sand & Supply Co., Atlanta, Ga., died August 3. A native of Indiana, Mr. Jamison came to Atlanta in 1900, after having served in the Spanish-American War. In 1907 he entered the road contracting business, establishing a partnership under the name of Jamison & Hallowell, which became one of the southern pioneers in the construction of hard-surfaced highways. The sand company was organized in 1910. Mr. Jamison played the cornet and was prominent in community fraternal organizations as a musician.

Col. Joseph A. Chapman, 73, long a leading figure in Tennessee phosphate operations, died recently at his home on the Nashville Highway a few miles north of Columbia, Tenn. Active until lately as manager of mining operations for the Armour Fertilizer Works, he had nearly 40 years' connection with phosphate interests in Maury and Hickman counties. Early he developed a phosphate field and built a railroad to the Century district, which he sold to the Federal Chemical Co. Then he developed the Bear Creek district and built the railroad from Dark's Mill up Rutherford Creek and across into the Bear Creek Valley and sold that to the Tennessee Chemical Co., with which he was connected when it was bought by Armour. He bought the property and built the plant and railroad to the present Armour mines.

Crushed Stone

Niles, Ohio: Installation of a limestone pulverizer in Vinton county has provided a new source of limestone for soil treatment of local farms.

Fred Osborne, contractor, recently began grinding limestone on the Perry Staud lands along the Skunk river, Denmark, Iowa. The crusher has a capacity of 40 tons a day.

Elgin, Kan.: J. A. Wells is foreman in charge of crushing at a quarry recently opened northeast of Elgin to prepare stone for the Elgin-Chautauqua road being improved as a WPA project.

Vinita, Okla.: The city council is contemplating rental of a rock crusher, as $27,000 is available through WPA for labor. The rock is to be used for the sewage disposal plant, street graveling and other projects.

Fairfield, Iowa: Jefferson county, counting on another WPA grant, was recently prospecting for a new, large quarry in Round Prairie township on the William Lovell farm, where the county has leased rock rights.

Burlington, Iowa: The city council has leased the old Kemper quarry south of town from Ed Gardner for a period of one year and the option of a second year at a rate of 5c per cu. yd. removed, guaranteeing minimum payment of $75 a quarter.

Corning, Iowa: The state has opened a new limestone quarry ¼ mile south of Corning to produce material for Highway 148 and other highways in the southwestern part of the state. This quarry is about 300 ft. northwest of the quarry which was opened in the 1870's by John Antil, a site now known as Spring Lake.

Phillipsburg, Kan.: Men from Phillips, Rooks and Osborne counties are working at the rock quarry on the Joe Brown farm south of Phillipsburg. Two crushers have been installed and rock is being prepared for use on Highway 24 under contract let to Dwight Hardman.

Owensville, Mo.: Gasconade county has been granted $8000 by the federal government for soil and water conservation purposes. The money will be used for crushing agricultural limestone, which will be available to farmers of the county at a nominal cost. Fourteen other Missouri drouth-stricken counties have similar grants.

Sand and Gravel

The Milwaukee Railroad has reopened the gravel pit south of Milford, Iowa. The pit has been made ready for digging sand.

The Stocker Gravel Plant, Gnadenhutten, Ohio, was damaged by fire August 11 to the extent of $2000. The office of this plant is at Port Washington, Ohio.

Sheldon, Iowa: The Osceola county board of supervisors recently purchased a gravel pit two miles south of Ocheyedan from G. Van Drie. The pit contains one acre and cost $500. Various roads will be graveled.

Santa Ana, Calif.: Orange county recently leased a 7½-acre gravel tract in the Olive area from the Jotham Bixby ranch interests. The lease is for 10 years at 10c per cubic yard of material removed. The deposit adjoins the old gravel pit, which is exhausted, and will furnish road material.

Cement

Alpha Portland Cement Co., Cementon, N. Y., plant resumed operation August 10.

Pennsylvania-Dixie Cement Corp., Kingsport, Tenn., plant was damaged to the extent of $3000 July 17 when it was struck by lightning, which ignited electric wiring in the attic of the office.

Manufacturers

Waukesha Motor Co., Waukesha, Wis., has completed preliminary arrangements for installing a life insurance plan under the benefits of which its employes will be covered.

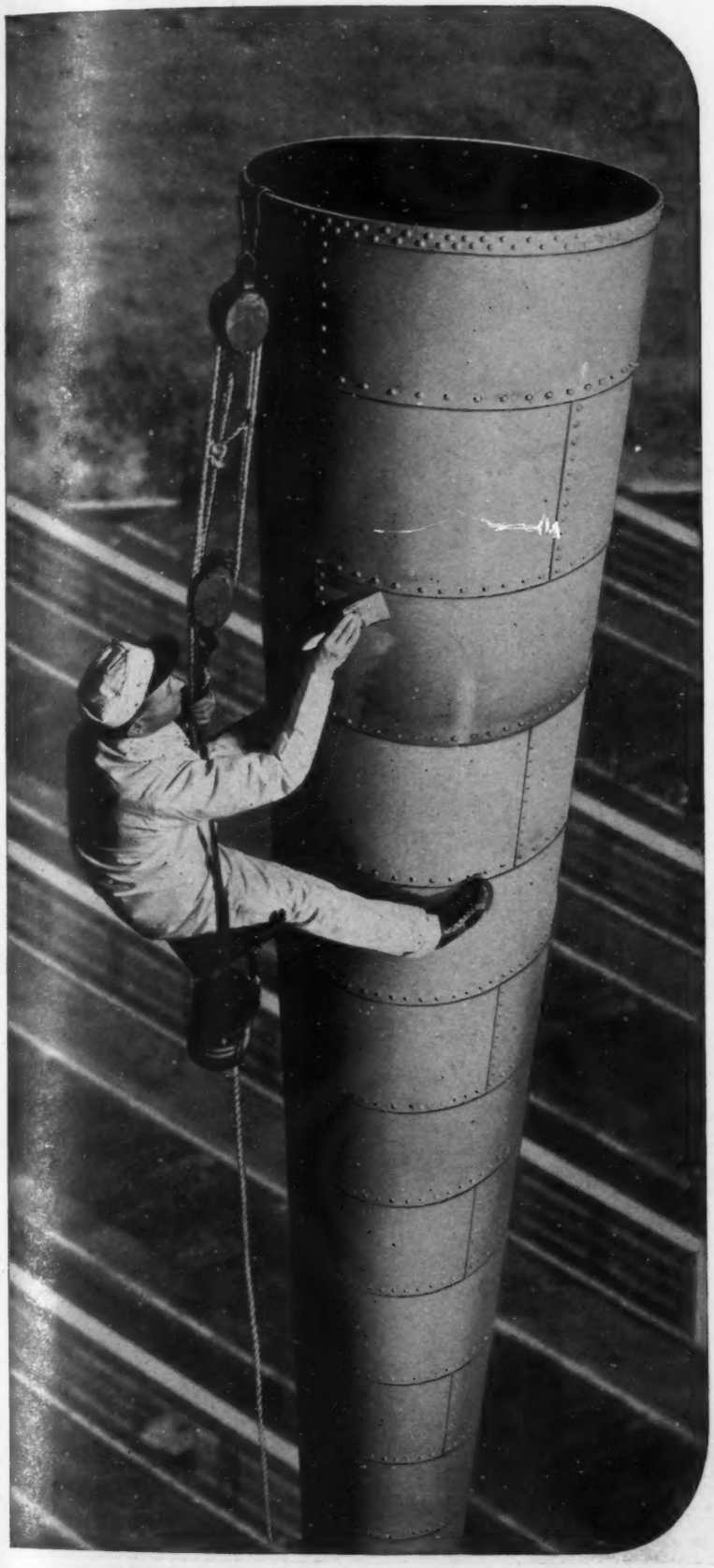
Hudson H. Bubar, New York, N. Y., designing engineer and manufacturer of dust collecting equipment, announces appointment of Arthur T. Hunter as manager of sales.

Worthington Pump and Machinery Corp., Harrison, N. J., announces appointment of Thomas Cruthers as vice-president. His connection with the company dates from 1907.

The Meriam Co., Cleveland, Ohio, is completing an addition to its present plant, to accommodate increased business in rebuilt gas and oil engines.

THE PAINT THAT STRETCHES

A typical example of Goodrich improvement in rubber



TOWERING 50 feet above a great chemical plant, a steel stack carries off fumes that are alternately hot and cold. Because the fumes are corrosive, the stack must be protected with paint, but because the steel expands and contracts at a different rate from the paint, the paint cracked and pulled off, and had to be renewed every 6 months.

Then Goodrich developed a paint that stretches. Made of rubber, it forms a skin over the object it covers—a skin as flexible, tight, protective as his hide is to a bull. This Goodrich paint was used to cover the chemical stack. That was 4 years ago, and it is still in perfect condition.

With *paint,* now made of rubber, the list of products which Goodrich can make of rubber is almost complete.

RUBBER CAN NOW BE MADE TO

—flex indefinitely without breaking . . . and Goodrich transmission belts set new performance records as a result.

—withstand abrasion . . . and Goodrich gravel chutes, ball mill linings and a hundred other applications outlast steel 10 to 1.

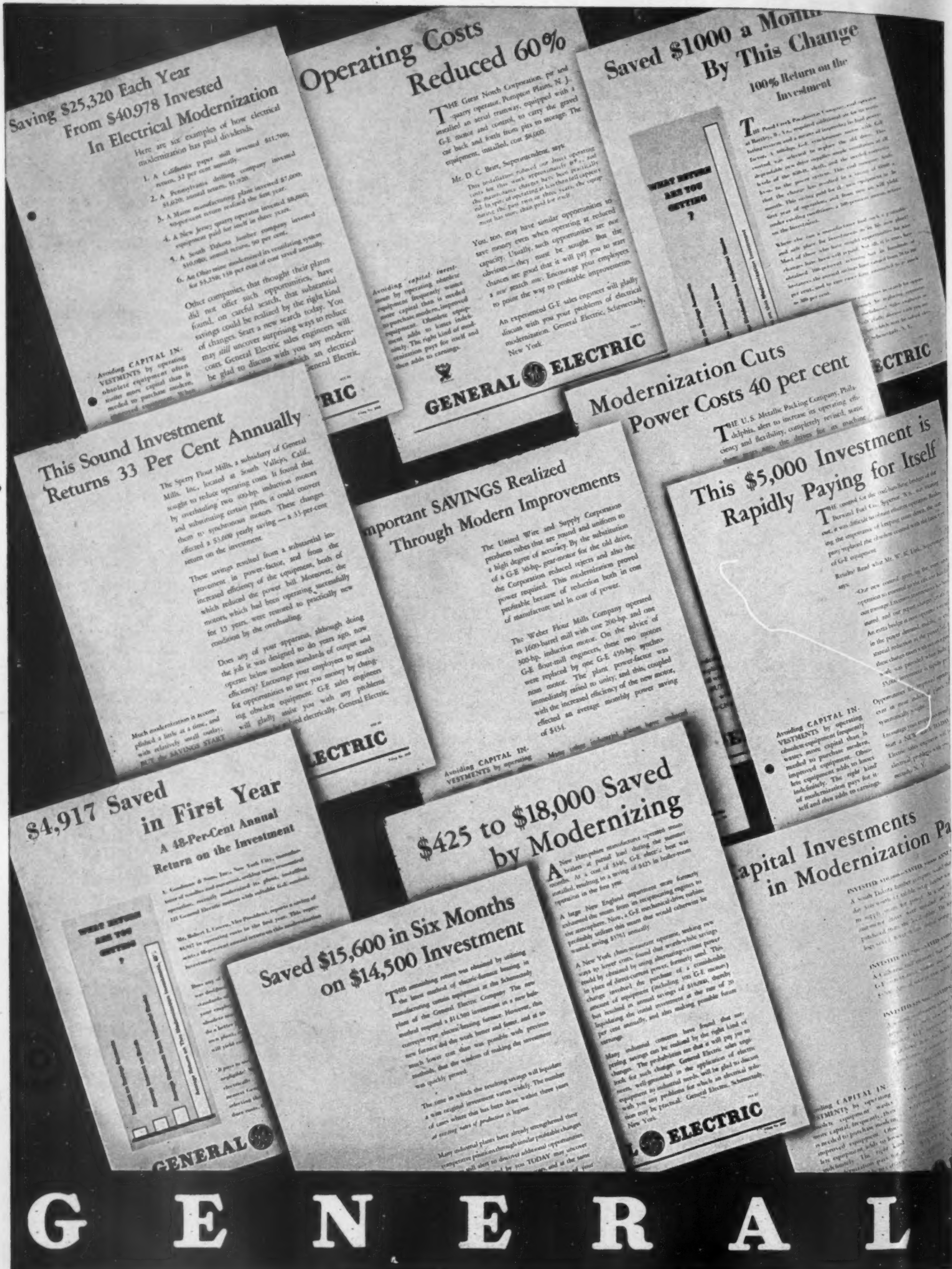
—resist chemicals, oil, time itself . . . and Goodrich-lined tanks and pipes drastically reduce pickling, plating, chemical handling costs; Goodrich hose lasts longer; Goodrich gaskets form life-long seals.

—adhere to metal . . . and industry benefits by longer-lived ball mills and chutes, vibration dampeners for machinery, rubber-lined tanks, tank cars.

In developing these new forms, new compounds, Goodrich engineers have learned how to make many improvements in rubber. All these new qualities go into all Goodrich products—belting, hose, packing, molded articles, to make them better values. The B. F. Goodrich Co., Mechanical Rubber Goods Division, Akron, Ohio.

Goodrich

ALL *products problems* IN RUBBER



The Cement Industry, too,

IS MODERNIZING FOR PROFITS

★

AND well it must, to keep pace with the rapidly growing market. Not only has building, both commercial and residential, shown a tremendous increase in the last year, but Federal appropriations for road building (more than $200,000,000) have created a demand for the products of cement and rock-products plants, necessitating not only new facilities but modernization of equipment now in operation.

The advertisements on the opposite page have been taken at random from our series on plant modernization. Each is an example of how one or more companies found it profitable to modernize a plant or process by using General Electric equipment.

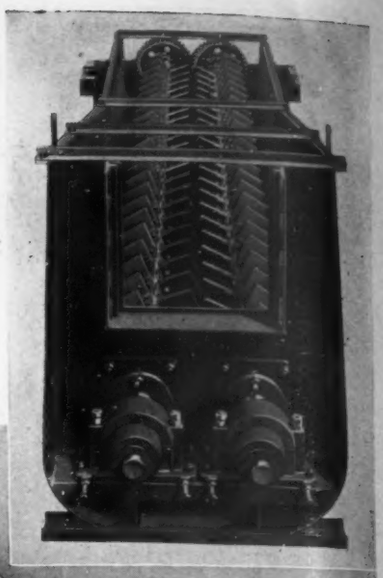
You, too, are looking to the future! Are you ready to take advantage of the tremendous possibilities in new construction and road building?

General Electric offers a complete line of equipment to fill every electrical requirement of your plant—motors and control especially designed to meet your particular needs, switchgear, cable, lighting equipment, turbines—engineered and manufactured by the largest producer of electric equipment in the world. Write to the nearest G-E office today. General Electric Company, Schenectady, New York.

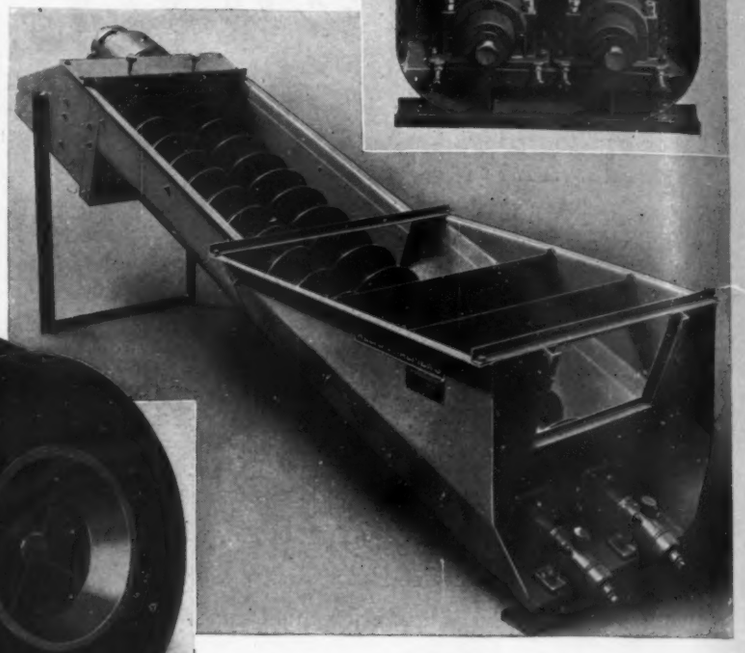
011 124

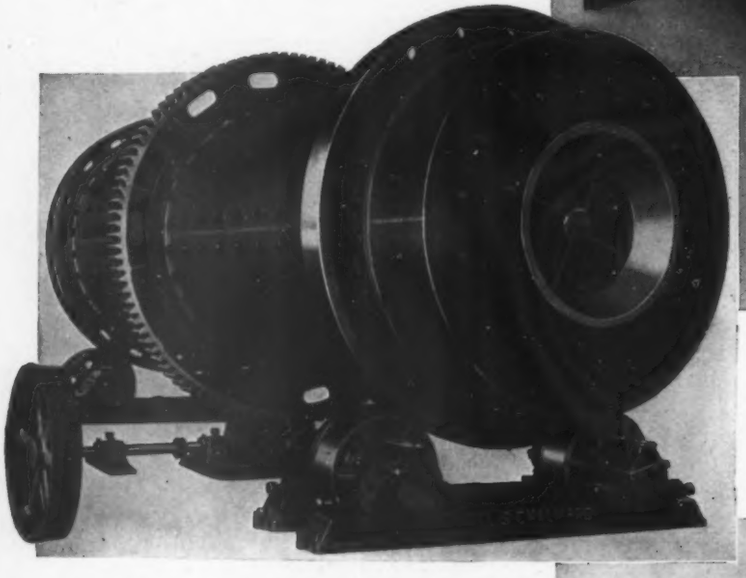
E L E C T R I C

Refer Your Washing Problems to Allis-Chalmers

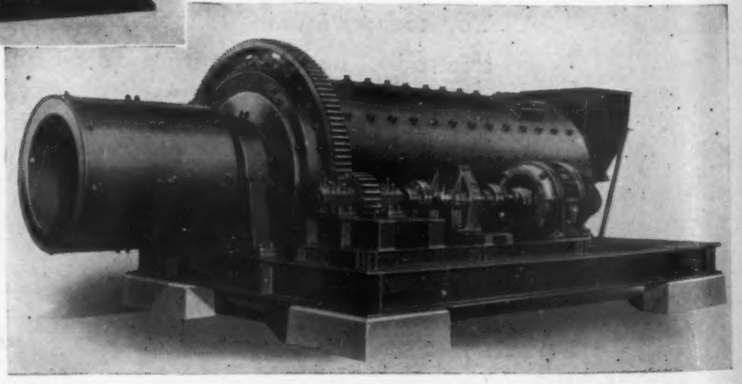


THE selection of the proper equipment to produce clean aggregates requires careful consideration, whether it is for a plant which has been operating dry or for a new washing plant. The experience of the Allis-Chalmers Manufacturing Company in the manufacture of equipment required for plants producing commercial aggregates dates from the industry's infancy, and this experience is reflected in the design and application of its products.





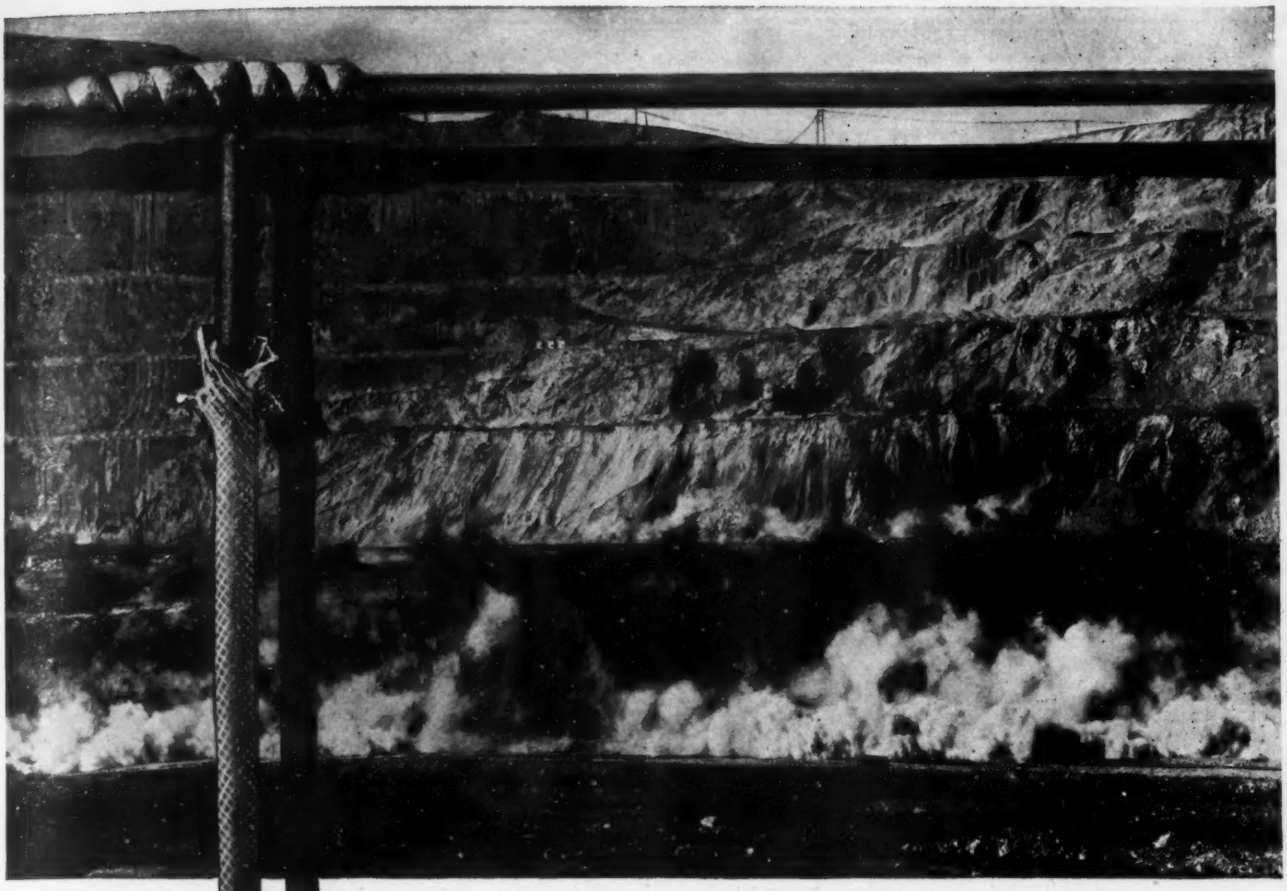
Double Screw Log Washer
Double Screw Sand Washer
Revolving Stone Scrubber
Revolving Blade Mill



Allis-Chalmers builds a complete line of scrubbers, log washers, sand washers, scrubber screens, and vibrating screens, especially designed for washing aggregates. The blade mill, shown at the right, is a new development. It is especially adapted to materials carrying large percentages of clay and may handle pieces of larger size than other types will take. Some materials require one type of machine and some another. Sometimes a combination of machines is necessary for removing all foreign material. We suggest you call on our nearest district office for further information or for recommendations on your particular problem.

ALLIS·CHALMERS

MILWAUKEE WISCONSIN



Another CORDEAU *Shot*

at the

NEVADA CONSOLIDATED COPPER CORP.

"Go in and *dig!*"

You'll agree, it's a beautiful shot. But its real beauty lies well below the surface, where each charge is doing a job that will mean proper fragmentation, easier removal.

Beautiful shots don't "just happen." They are planned: (1) to get more work from explosives through direct detonation of each cartridge; (2) to fire the charges in split-second rotation that permits relief of burden, resulting in disintegration as well as displacement.

These are normal results when Cordeau-Bickford Detonating Fuse is used to detonate each charge and connect all holes. Simplified loading with less hazard are other features, equally important.

Let us send you, free, a copy of the Cordeau Book.

CB-53

The ENSIGN-BICKFORD COMPANY, Simsbury, Connecticut
SAFETY FUSE Since 1836 • CORDEAU-BICKFORD DETONATING FUSE

Classified Directory of Advertisers in this Issue of ROCK PRODUCTS

For alphabetical index, see page 2

Abrasive Wheels
Manhattan Rubber Mfg. Div. of Raybestos - Manhattan, Inc.

Agitators, Thickeners and Slurry Mixers
F. L. Smidth & Co.

Airveyor
Fuller Co.

Air Compressors
Curtis Pneumatic Machy. Co.
Fuller Co.
Gardner-Denver Co.
Nordberg Mfg. Co.
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.
Worthington Pump & Machy. Corp.

Air Filters
Fuller Co.

Air Hoists
Curtis Pneumatic Machy. Co.

Air Separators
Bradley Pulverizer Co.
Raymond Bros. Impact Pulv. Co.
Sturtevant Mill Co.
Universal Road Machy. Co.
Williams Patent Crusher & Pulv. Co.

Air Tool Hose
Worthington Pump & Machy. Corp.

Applicator Bars
Stulz-Sickles Co.

Babbitt Metal
Joseph T. Ryerson & Son, Inc.

Backfillers
Bucyrus-Erie Co.
Harnischfeger Corp.

Ball Bearings
SKF Industries, Inc.

Balls, Grinding, (See Grinding Balls)

Balls (Tube Mill, etc.)
Allis-Chalmers Mfg. Co.
Carnegie-Illinois Steel Corp. (United States Steel Corp. Subsidiary)
F. L. Smidth & Co.

Bar Benders and Cutters
Koehring Co.

Batchers
Fuller Company

Bearings
Link-Belt Co.
Joseph T. Ryerson & Son, Inc.
SKF Industries, Inc.
Timken Roller Bearing Co.

Bearings (Anti-Friction)
SKF Industries, Inc.
Timken Roller Bearing Co.

Bearings (Roller)
SKF Industries, Inc.
Timken Roller Bearing Co.

Bearings (Tapered Roller)
Timken Roller Bearing Co.

Bearings (Thrust)
SKF Industries, Inc.
Timken Roller Bearing Co.

Belt Fasteners
Flexible Steel Lacing Co.

Belt Lacing (Steel)
Flexible Steel Lacing Co.

Belting
Hewitt Rubber Corp.

Belting (Elevator and Conveyor)
B. F. Goodrich Co.
Hewitt Rubber Corp.
Manhattan Rubber Mfg. Div. of Raybestos - Manhattan, Inc.

Belting (Metal, Conveyor, High and Low Temperature)
Wickwire Spencer Steel Co.

Belting (Transmission)
B. F. Goodrich Co.
Hewitt Rubber Corp.
Manhattan Rubber Mfg. Div. of Raybestos - Manhattan, Inc.

Belting (V Type)
B. F. Goodrich Co.
Manhattan Rubber Mfg. Div. of Raybestos - Manhattan, Inc.

Bin-Dicators
Bin-Dicator Co.

Bin Gates
Fuller Co.
Link-Belt Co.
Sprout, Waldron & Co., Inc.
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.

Bins
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.

Blasting Cap Protectors
B. F. Goodrich Co.

Blasting Machines
Atlas Powder Co.

Blasting Supplies
Atlas Powder Co.

Blasting Powder (See Powder, Blasting)

Blocks (Pillow, Roller Bearing)
Link-Belt Co.
SKF Industries, Inc.
Timken Roller Bearing Co.

Blocks (Sheave)
American Manganese Steel Co.

Boilers
Babcock & Wilcox Co.

Boots and Shoes
B. F. Goodrich Co.

Brake Lining (Asbestos)
Manhattan Rubber Mfg. Div. of Raybestos - Manhattan, Inc.

Breakers (Primary)
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Bucket Dumps
Dempster Bros., Inc.

Buckets (Clamshell, Grab, Orange Peel, etc.)
Geo. Haiss Mfg. Co., Inc.
Harnischfeger Corp.
Hayward Company
Link-Belt Co.
Owen Bucket Co.
Wellman Engineering Co. (G. H. Williams)

Buckets (Dragline and Slackline)
American Manganese Steel Co.
Bucyrus-Erie Co.
Owen Bucket Co.
Page Engineering Co.
Wellman Engineering Co. (G. H. Williams)

Buckets (Dredging and Excavating)
Harnischfeger Corp.
Owen Bucket Co.

Buckets (Elevator and Conveyor)
Cross Engineering Co.
Hendrick Mfg. Co.
Jeffrey Mfg. Co.
Link-Belt Co.

Bulldozers
Koehring Co.

Cableways
Broderick & Bascom Rope Co.
General Electric Co.
Link-Belt Co.
Macwhyte Company
Williamsport Wire Rope Co.

Calcinators
Bradley Pulverizer Co.

Calcining Kettles (Gypsum)
J. B. Ehrsam & Sons Mfg. Co.

Cap Crimpers and Fuse Cutters
Ensign-Bickford Co.

Caps (Blasting)
Atlas Powder Co.

Car Pullers
Link-Belt Co.

Cars (Dump)
Carnegie-Illinois Steel Corp. (United States Steel Corp. Subsidiary)

Cars (Quarry & Gravel Pit)
Carnegie-Illinois Steel Corp. (United States Steel Corp. Subsidiary)
Koppel Industrial Car & Equip. Co.

Castings
Babcock & Wilcox Co.
Eagle Iron Works (Grey Iron)
Link-Belt Co.
Timken Roller Bearing Co.

Cement Making Machinery
F. L. Smidth & Co.

Cement Process
Cement Process Corp.

Cement Pumps
Fuller Co.
F. L. Smidth & Co.

Chain (Dredge and Steam Shovel)
Bucyrus-Erie Co.
Jeffrey Mfg. Co.

Chain (Elevating and Conveying)
American Manganese Steel Co.
Chain Belt Co.
Link-Belt Co.

Chain Systems (Kilns)
F. L. Smidth & Co.

Chute or Launder Lining
B. F. Goodrich Co.
Manhattan Rubber Mfg. Div. of Raybestos - Manhattan, Inc.

Chutes and Chute Liners
American Manganese Steel Co.
Cross Engineering Co.

Clarifiers
Hardinge Co., Inc.

Classifiers
Hardinge Co., Inc.
Knickerbocker Company
Link-Belt Co.

Clay Working Machinery
Bonnot Company

Clips (Wire Rope)
Broderick & Bascom Rope Co.
Macwhyte Company
Williamsport Wire Rope Co.

Coal Crushers and Rolls
Williams Patent Crusher & Pulv. Co.

Coal Pulverizing Equipment
Babcock & Wilcox Co.
Bonnot Company
Bradley Pulverizer Co.
Gruendler Crusher & Pulv. Co.
Pennsylvania Crusher Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Williams Patent Crusher & Pulv. Co.

Compressed Air Hoists
Gardner-Denver Co.

Compressed Air Rock Drills
Cleveland Rock Drill Co.
Gardner-Denver Co.

Compressors (See Air Compressors)

Concrete Pipe Machinery
Universal Concrete Pipe Co.

Concrete Slab Raising Equipment (Mud-Jack)
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Conveyor Belting (See Belting)

Conveyor Idlers and Rolls
C. O. Bartlett & Snow Co.
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Earle C. Bacon, Inc.
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Fuller Company
Jeffrey Mfg. Co. (Vibrating)
Lewistown Fdy. & Mach. Co.
Link-Belt Co.
Robins Conveying Belt Co.
F. L. Smidth & Co.
Smith Engineering Works
Sturtevant Mill Co.
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.
Williams Patent Crusher & Pulv. Co.

Conveyors (Pneumatic)
Fuller Company

Conveyors (Screw)
Link-Belt Co.

Coolers (See Kilns and Coolers, Rotary)

Correcting Basins
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Couplings (Air Hose)
Cleveland Rock Drill Co.

Couplings (Flexible and Shaft)
Link-Belt Co.

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Hewitt Rubber Corp.

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Curtis Pneumatic Machy. Co.

Cranes (Clamshell)
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Harnischfeger Corp.
Koehring Co.

Cranes (Crawler and Locomotive)
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Harnischfeger Corp.
Koehring Co.
Link-Belt Co.
Michigan Power Shovel Co.
Northwest Engineering Co.

Cranes (Excavator)
Koehring Co.

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Harnischfeger Corp.

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Crushers (Hammer)
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Use GULF DIESEL OILS for low operating costs on tough jobs!

MANY operators of equipment like that shown above have established this important fact: Over-all operating costs usually have a direct relationship to the efficiency of lubrication. With Gulf Diesel Oil in service many operators are reporting the lowest costs in their experience.

Gulf Diesel Oils stand up over long periods of service—cost less to use in the long run. These quality lubricants have been scientifically manufactured to provide maximum protection for cylinders, pistons and bearings—with low consumption. They will help you keep maintenance costs at a low level.

5 REASONS... Why Gulf DIESEL OILS Reduce Operating Costs

1 GULF DIESEL OILS are especially manufactured for lubrication of Diesel engines. High temperatures, contamination with fuel and moisture and constant churning in the presence of air—all encountered in Diesel engine operation—necessitate the use of an oil especially prepared to withstand these conditions.

2 GULF DIESEL OILS insure minimum wear of cylinders, pistons and bearings. The tough film provided by GULF DIESEL OILS is not readily removed from the cylinder walls and pistons, insuring proper lubrication of these parts at all times.

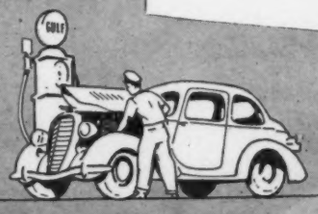
3 GULF DIESEL OILS insure minimum consumption. Because they are made from specially selected crudes and manufactured by the most modern refining methods, GULF DIESEL OILS withstand the high temperatures encountered in Diesel engine operation. A minimum of make-up oil is required.

4 GULF DIESEL OILS reduce operating costs. Because of the stability and high lubricating quality of these oils, wear and repair expense are minimized. Lower oil consumption and lower maintenance costs reflect substantial savings in over-all operating costs.

5 GULF DIESEL OILS are low in carbon content—a safeguard against carbon deposits resulting from the lubricating oil. With good atomization of fuel and complete combustion, rings retain their freedom. Thus, the oil contributes to full power and operating efficiency.

Gulf Oil Corporation
Gulf Refining Company
General Offices: Gulf Building, Pittsburgh, Pa.

GULF INDUSTRIAL LUBRICATION



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C. G. Buchanan Co., Inc.
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Nordberg Mfg. Co.
Pennsylvania Crusher Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Reduction)
Bonnot Company
Jeffrey Mfg. Co.

Crushers (Roll)
Gruendler Crusher & Pulv. Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Rotary)
J. B. Ehrsam & Sons Mfg. Co.

Crushers (Single Roll)
Gruendler Crusher & Pulv. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
McLanahan & Stone Corp.
Pennsylvania Crusher Co.

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Allis-Chalmers Mfg. Co.
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Whiting Corp.

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Dippers (Manganese Steel)
American Manganese Steel Co.

Dippers and Teeth (Steam Shovel)
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The Frog, Switch & Mfg. Co.

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Harnischfeger Corp.

Draglines
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Harnischfeger Corp.
Link-Belt Co.

Draglines (Gasoline or Electric)
Koehring Co.
Northwest Engineering Co.
Page Engineering Co.

Dragline Excavators
Bucyrus-Erie Co.
Harnischfeger Corp.
Michigan Power Shovel Co.
Northwest Engineering Co.
Page Engineering Co.

Dragline Cableway Excavators
Bucyrus-Erie Co.
Link-Belt Co.
Sauerman Bros.

Dredge Pumps (See Pumps, Dredging)

Dredges
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Hayward Co.
Hetherington & Berner, Inc.
Morris Machine Works

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Drill Steel
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Worthington Pump & Machy. Corp.

Drilling Accessories
Cleveland Rock Drill Co.

Drills
Bucyrus-Erie Co.
Timken Roller Bearing Co.

Drills (Blast Hole)
Worthington Pump & Machy. Corp.

Drills, Hammer (See Hammer Drills)

Drills (Rock)
Cleveland Rock Drill Co.
A. Courchesne, Inc.
Gardner-Denver Co.

Drills (Tripod)
Cleveland Rock Drill Co.

Drills (Wagon)
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Koehring Co.

Dust Collecting Systems
Allis-Chalmers Mfg. Co.
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Dust Conveying Systems
Fuller Company

Dynamite
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General Electric Co.

Elevator Belting (See Belting)

Emery Mills
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Engineers
Bonnot Company
Fuller Co.
Hetherington & Berner, Inc.
Productive Equipment Corp
F. L. Smidth & Co.
Sturtevant Mill Co.
Williams Patent Crusher & Pulv. Co.

Engines (Diesel)
Nordberg Mfg. Co.
Worthington Pump & Machy. Corp.

Engines (Gasoline, Kerosene and Oil)
Worthington Pump & Machy. Corp.

Engines (Steam)
Morris Machine Works

Excavating Machinery (See Shovels, Cranes, Buckets, etc.)

Excavators (Crawling Tractor)
Koehring Co.

Excavators (Dragline)
Koehring Co.

Explosives
Atlas Powder Co.

Fans
General Electric Co.

Feeders
Babcock & Wilcox Co. (Pulverized Coal)
Fuller Co. (Cement and Pulverized Material)
Hardinge Company, Inc. (Weighing)
Smith Engineering Works (Plate)

Forges (Oil)
Gardner-Denver Co.

Fuses (Detonating and Safety)
Ensign-Bickford Co.

Fuses (Electrical)
General Electric Co.

Galvanized Wire Strand
Macwhyte Company

Gaskets
B. F. Goodrich Co.
Hewitt Rubber Corp.
Manhattan Rubber Mfg. Div. of Raybestos - Manhattan, Inc.

Gasoline
Socony-Vacuum Oil Co., Inc.
Texas Company

Gears and Pinions
General Electric Co.
Link-Belt Co.

Gelatin and Semi-Gelatin (See Explosives)

Grapples
Owen Bucket Co.

Grease
Gulf Refining Co
Socony-Vacuum Oil Co., Inc.
Texas Company

Grinding Balls
Babcock & Wilcox Co.
Carnegie-Illinois Steel Corp. (United States Steel Corp. Subsidiary)

Grizzlies
American Manganese Steel Co.
Productive Equipment Corp.
Smith Engineering Works
Traylor Eng. & Mfg. Co.

Grizzly Feeders
Traylor Eng. & Mfg. Co.

Gypsum Plaster Plants
J. B. Ehrsam & Sons Mfg. Co.

Hammer Drills
Cleveland Rock Drill Co.
Gardner-Denver Co.

Hammer Mills (See Crushers)

Hoists
Curtis Pneumatic Machy. Co.
Gardner-Denver Co.
Harnischfeger Corp.
Link-Belt Co.
Northwest Engineering Co.

Hooks (Wire Rope)
Macwhyte Company

Hose (Water, Steam, Air Drill, Pneumatic, Sand Suction and Discharge)
Cleveland Rock Drill Co.
B. F. Goodrich Co.
Hewitt Rubber Corp.
Manhattan Rubber Mfg. Div. of Raybestos - Manhattan, Inc.

Hose Couplings (See Couplings—Hose, Pipe, etc.)

I-Beam Trolleys
Curtis Pneumatic Machy. Co.

Indicators (Bin)
Bin-Dicator Co.

Insulation (Electric)
General Electric Co.

Kilns and Coolers (Rotary)
Allis-Chalmers Mfg. Co.
Bonnot Company
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.

Kominuters (See Mills)

Laboratory Crushers
Sturtevant Mill Co.
Williams Patent Crusher & Pulv. Co.

Lamp Guards
Flexible Steel Lacing Co.

Lighters, Hot Wire (For Safety Fuse)
Ensign-Bickford Co.

Lime Handling Equipment
Fuller Company
Link-Belt Co.
Raymond Bros. Impact Pulv. Co.

Lime Kilns (See Kilns and Coolers, Rotary)

Linings (Iron for Ball and Tube Mills) (See Mill Liners)

Linings (Rubber for Chutes, Ball and Tube Mills, Tank and Pipe)
B. F. Goodrich Co.
Manhattan Rubber Mfg. Div. of Raybestos - Manhattan, Inc.

Loaders and Unloaders
Bucyrus-Erie Co.
Fuller Company
Geo. Haiss Mfg. Co., Inc.
Link-Belt Co.
Northwest Engineering Co.
Universal Road Machy. Co.

Locomotive Cranes (See Cranes, Crawler and Locomotive)

Locomotives (Geared)
Lima Locomotive Works, Inc.

Locomotives (Steam, Gas and Electric)
General Electric Co.
Lima Locomotive Works, Inc.

Locomotives (Storage Battery)
General Electric Co.

Log Washer
McLanahan & Stone Corp.
Smith Engineering Works

Lubricants
Broderick & Bascom Rope Co. (Wire Rope)
Gulf Refining Co.
Macwhyte Co. (Wire Rope)
Socony-Vacuum Oil Co., Inc.
Texas Company

Machinery Guards
Harrington & King Perforating Co.

Magnetic Pulleys
Birdsboro Steel Foundry & Mach. Co.
C. G. Buchanan Co., Inc.

Magnets
General Electric Co.

Manganese Steel (Plates and Sheets)
Manganese Steel Forge Co., Inc.

Manganese Steel Castings
American Manganese Steel Co.
The Frog, Switch & Mfg. Co.

Manganese Steel Parts
American Manganese Steel Co.

Mechanical Rubber Goods
B. F. Goodrich Co.
Manhattan Rubber Mfg. Div. of Raybestos - Manhattan, Inc.

Mill Liners and Linings (Iron for Ball and Tube Mills)
Babcock & Wilcox Co.
Carnegie-Illinois Steel Corp. (United States Steel Corp. Subsidiary)
F. L. Smidth & Co.

Mills, Grinding (Ball, Tube, etc.) (See also Crushers Hammer)
Allis-Chalmers Mfg. Co.
Bonnot Company
Bradley Pulverizer Co.
Gruendler Crusher & Pulv. Co.
Hardinge Co., Inc.
Knickerbocker Company
Raymond Bros. Impact Pulv Co.
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.
Williams Patent Crusher & Pulv. Co.

Mine Car Hitchings
Macwhyte Company

Mixers (Commercial Concrete)
Jaeger Machine Co.

Mixers (Concrete)
Gruendler Crusher & Pulv. Co.
Koehring Co.

Motors and Generators (Electric Units)
Allis-Chalmers Mfg. Co.
General Electric Co.
Harnischfeger Corp.

Oil Burners
Babcock & Wilcox Co.
F. L. Smidth & Co.

Oils (Lubricating)
Gulf Refining Co.
Socony-Vacuum Oil Co., Inc.
Texas Company

Classified Directory—*Continued*

Overhead Traveling Cranes
Curtis Pneumatic Machy. Co.

Packings (Pump, Valve, etc.)
B. F. Goodrich Co.
Hewitt Rubber Corp.
Manhattan Rubber Mfg. Div. of Raybestos - Manhattan, Inc.

Paint (Asphalt)
Texas Company

Pavers (Concrete)
Koehring Co.

Perforated Metal
Cross Engineering Co.
Harrington & King Perforating Co.
Hendrick Mfg. Co.
Wickwire Spencer Steel Co.

Pipe Molds (Concrete)
Universal Concrete Pipe Co.

Plaster Board and Wallboard Equipment
J. B. Ehrsam & Sons Mfg. Co.

Plates (Double Corrugated)
Hendrick Mfg. Co.

Pneumatic Drills (See Drills)

Portable Conveyors
Fuller Company
Geo. Haiss Mfg. Co., Inc.
Link-Belt Co.

Portable Crushing and Screening Unit
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Powder (Blasting)
Atlas Powder Co.

Power Transmission Machinery
SKF Industries, Inc.

Pulleys, Magnetic (See Magnetic Pulleys)

Pulverators
Allis-Chalmers Mfg. Co.

Pulverizers (See also Crushers, Mills, etc.)
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Bonnot Company
Bradley Pulverizer Co.
Dixie Machy. Mfg. Co.
Gruendler Crusher & Pulv. Co.
Knickerbocker Company
Pennsylvania Crusher Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Sturtevant Mill Co.
Universal Road Machy. Co.
Williams Patent Crusher & Pulv. Co.

Pulverizer Parts
American Manganese Steel Co.

Pumps (Air Lift)
Fuller Company

Pumps (Cement)
Fuller Company

Pumps (Cement Slurry)
American Manganese Steel Co.
Morris Machine Works
F. L. Smidth & Co.
A. R. Wilfley & Sons

Pumps (Centrifugal)
Allis-Chalmers Mfg. Co.
Hetherington & Berner, Inc.
Kansas City Hay Press Co.
Morris Machine Works
A. R. Wilfley & Sons

Pumps (Dredging)
American Manganese Steel Co.
Bucyrus-Erie Co.
Morris Machine Works
Worthington Pump & Machy. Corp.

Pumps (Pulverized Coal)
Babcock & Wilcox Co.

Pumps (Sand and Gravel)
Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Hetherington & Berner, Inc.
Kansas City Hay Press Co.
Morris Machine Works
A. R. Wilfley & Sons

Quarry Bars
Worthington Pump & Machy. Corp.

Railways (Electric)
General Electric Co.

Railway Equipment
General Electric Co.

Reinforcement Fabric (Concrete)
Wickwire Spencer Steel Co.

Road Machinery
Harnischfeger Corp.
Koehring Co.
Northwest Engineering Co.

Rock Bits (See Drill Bits)

Rock Drills (See Drills, Rock)

Rock Wool Machinery
Whiting Corp.

Rod Mills
Traylor Eng. & Mfg. Co.

Rods (Wire)
Wickwire Spencer Steel Co.

Roller Bearings
SKF Industries, Inc.
Timken Roller Bearing Co.

Roofing (Ready to Lay)
Texas Company

Roofing and Siding (Steel)
Joseph T. Ryerson & Son, Inc.

Rope, Wire (See Wire Rope)

Rubber Covered Screens
B. F. Goodrich Co.

Rubber Molded Goods
Manhattan Rubber Mfg. Div. of Raybestos - Manhattan, Inc.

Sand Drag
Smith Engineering Works

Sand and Gravel Handling Equipt.
Sprout, Waldron & Co., Inc.

Sand and Gravel Screening & Washing Equipt.
Universal Road Machy. Co.

Sand Settling Tanks
Link-Belt Co.
Smith Engineering Works

Scrapers (Power Drag)
Harnischfeger Corp.
Link-Belt Co.
Northwest Engineering Co.
Sauerman Bros.

Screens
Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Earle C. Bacon, Inc.
C. O. Bartlett & Snow Co.
Carnegie-Illinois Steel Corp. (United States Steel Corp. Subsidiary)
Chicago Perforating Co.
Cleveland Wire Cloth & Mfg. Co.
Cross Engineering Co.
Harrington & King Perf. Co.
Hendrick Mfg. Co.
Link-Belt Co.
Manganese Steel Forge Co., Inc.
National Wire Cloth Co.
Nordberg Mfg. Co.
Smith Engineering Works
Sturtevant Mill Co.
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.
Universal Vibrating Screen Co.
Williams Patent Crusher & Pulv. Co.

Screens, Scalping (Hercules and Standard)
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Screens (Vibrating)
Link-Belt Co.
Nordberg Mfg. Co.
Robins Conveying Belt Co.
Smith Engineering Works
Sturtevant Mill Co.
W. S. Tyler Co.
Williams Patent Crusher & Pulv. Co.

Screens, Washing (Hercules, Ajax and Standard)
Smith Engineering Works

Screens (Woven Wire)
Wickwire Spencer Steel Co.

Screw Rewasher (Single and Twin)
Smith Engineering Works

Scrubbers, Washers
Allis-Chalmers Mfg. Co.
Hardinge Company, Inc.
Knickerbocker Company
Smith Engineering Works

Seal Rings
Traylor Eng. & Mfg. Co.

Separators (Magnetic)
Birdsboro Steel Foundry & Mach. Co.
C. G. Buchanan Co., Inc.

Separators (Slurry)
F. L. Smidth & Co.

Shovels, Power (Steam, Gas, Electric, Diesel, Oil)
Bucyrus-Erie Co.
Harnischfeger Corp.
Koehring Co.
Link-Belt Co.
Michigan Power Shovel Co.
Northwest Engineering Co.

Silos
F. L. Smidth & Co.

Skip Hoists and Skips
Link-Belt Co.

Slings (Wire Rope)
American Cable Co., Inc.
A. Leschen & Sons Rope Co.
Macwhyte Company
Williamsport Wire Rope Co.

Sockets (Wire Rope)
Macwhyte Company

Soft Stone Eliminator
Knickerbocker Company

Speed Reducers
Link-Belt Co.
Traylor Eng. & Mfg. Co.

Springs (Extension, Compression, Torsion or Flat)
Wickwire Spencer Steel Co.

Steam Shovel Repair Parts
American Manganese Steel Co.

Steel (Abrasion Resisting)
Joseph T. Ryerson & Son, Inc.

Steel Bars
Timken Roller Bearing Co.

Steel (Bars, Shapes, Plates, etc.)
Joseph T. Ryerson & Son, Inc.

Steel (Electric Furnace)
Timken Roller Bearing Co.

Steel (Open Hearth)
Timken Roller Bearing Co.

Steel (Special Alloy)
Timken Roller Bearing Co.

Steel (Special Analysis)
Timken Roller Bearing Co.

Steels, Drill (See Drill Steel)

Stokers
Babcock & Wilcox Co.

Tanks
Link-Belt Co.

Thimbles
Macwhyte Company

Tires and Tubes
B. F. Goodrich Co.

Track Equipment
Carnegie-Illinois Steel Corp. (United States Steel Corp. Subsidiary)
Nordberg Mfg. Co.

Track Shifters
Nordberg Mfg. Co.

Tractors
Kansas City Hay Press Co.
Koehring Co.

Tramways (Aerial Wire Rope)
Broderick & Bascom Rope Co.
A. Leschen & Sons Rope Co.
Macwhyte Company
Williamsport Wire Rope Co.

Transmission Belting (See Belting)

Transmission Machinery
Allis-Chalmers Mfg. Co.
Timken Roller Bearing Co.

Truck Bodies (Ready Mixed Concrete)
Jaeger Machine Co.

Trucks (Mixers)
Jaeger Machine Co.

Trucks and Trailers (See Motor Trucks)

Tube Mills (See Mills, Ball, Tube, etc.)

Tube Mill Liners (See Mill Liners)

Tubing (Blasting)
B. F. Goodrich Co.
Manhattan Rubber Mfg. Div. of Raybestos - Manhattan, Inc.

Tubing (Seamless Steel)
Timken Roller Bearing Co.

Turnbuckles
Macwhyte Company

Underground Shovels
Nordberg Mfg. Co.

Valves (Air)
Cleveland Rock Drill Co.

Valves (Pump)
B. F. Goodrich Co.
Manhattan Rubber Mfg. Div. of Raybestos - Manhattan, Inc.

Vibrating Screens (See Screens, Vibrating)

Washers (Sand, Gravel and Stone)
Allis-Chalmers Mfg. Co.
Eagle Iron Works
Gruendler Crusher & Pulv. Co.
Knickerbocker Company
Link-Belt Co.
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.

Weighing Equipment
Richardson Scale Co.

Weigh-Mix
Koehring Co.

Welding and Cutting Apparatus
General Electric Co.
Harnischfeger Corp.

Welding Electrodes (Nickel Manganese Steel)
Stulz-Sickles Co.

Welding Rod
Joseph T. Ryerson & Son, Inc.

Wire (Flat, Round, Square or Special Shapes)
Wickwire Spencer Steel Co.

Wire (Piano and Music)
Wickwire Spencer Steel Co.

Wire Cloth
Cleveland Wire Cloth & Mfg. Co.
National Wire Cloth Co.
W. S. Tyler Co.
Wickwire Spencer Steel Co.

Wire Rope
American Cable Co., Inc.
Broderick & Bascom Rope Co.
A. Leschen & Sons Rope Co.
Macwhyte Company
Wickwire Spencer Steel Co.
Williamsport Wire Rope Co.

Wire Rope (Monel Metal)
Macwhyte Company

Wire Rope (Non-Corrosive)
Macwhyte Company

Wire Rope Fittings
American Cable Co., Inc.
Broderick & Bascom Rope Co.
A. Leschen & Sons Rope Co.
Macwhyte Company
Williamsport Wire Rope Co.

Wire Rope Slings (See Slings, Wire Rope)

Wire Rope Sockets (See Sockets, Wire Rope)

Users Report on Yardage Increases—Read What They Say

A Contractor Writes:

*"It comes nearest to doing the work of a shovel bucket in rock, with all the advantages of the dragline that I believe possible."

From a Gravel Plant Owner:

*"Has increased our production at least 75%. To us the Page AUTOMATIC is the **only** bucket for dragline work."

A Strip Mine Operator Says:

*"Can truthfully say that since putting on your AUTOMATIC we are stripping at least 50% more material."

* From letters in our files.

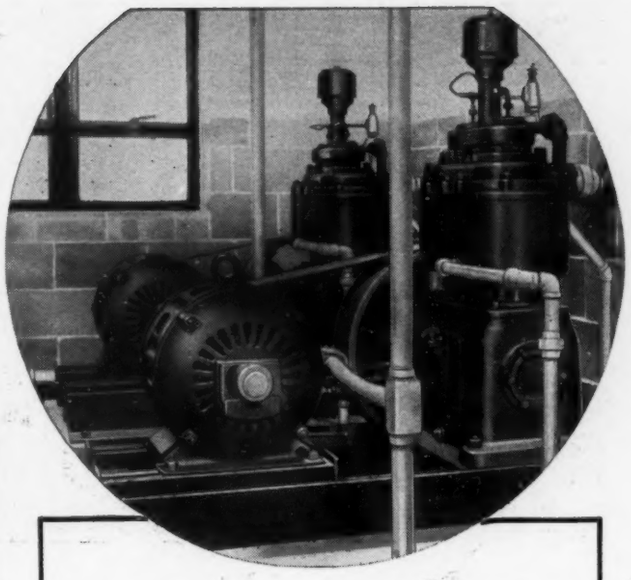
You also can increase your yardage and dragline profits! For information on a size and weight AUTOMATIC bucket for your machine and job—see your equipment dealer or write us direct. Free bulletin, "The AUTOMATIC" gladly sent on request.

Address Dept. K

BUILT IN SIZES 3/8 to 15 CUBIC YARDS

"DIG WITH A PAGE AUTOMATIC"

PAGE ENGINEERING COMPANY
CLEARING POST OFFICE CHICAGO, ILLINOIS



Proven Economy IN CURTIS COMPRESSORS

Actual operating records prove that Curtis compressors provide dependable air service at a minimum cost. Curtis' 82 years' engineering experience is reflected in this unusual economy, the result of such design features as:

- *Timken Roller Bearings*
- *Carbon-free Disc Valves*
- *Centro-ring Oiling*
- *Fully enclosed*
- *All parts readily accessible*
- *Capacities up to 360 CFM*

Let us send you the proof of Curtis economy. Write for Bulletin C4B and surveys giving facts and figures on actual records of Curtis installations.

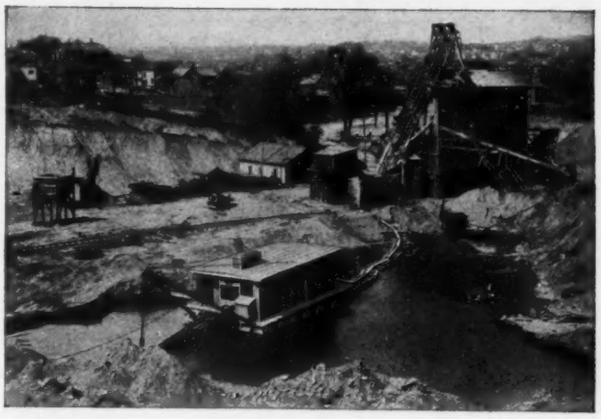
CURTIS PNEUMATIC MACHINERY CO.
1988 Kienlen Ave., St. Louis, Mo.
NEW YORK • CHICAGO • SAN FRANCISCO

CURTIS

COMPRESSORS • AIR HOISTS
I-BEAM CRANES AND TROLLEYS

The MORRIS HYDRAULIC COLUMN

News of interest to Centrifugal Pump Users



Putting a prod into your production . . . .

Sand and gravel producers continually tell us how their Morris Hydraulic Dredges solve their operating troubles, speed up production, and give lastingly good service. In one case, a Morris Dredge enabled the purchaser to handle compacted material economically, after the equipment used by four other operators had failed. In another case, a Morris Dredge is delivering almost twice the material that had been expected. In a third case, the wearing parts of a Morris Dredge were found to be in perfectly good condition after handling over half-a-million cubic yards of particularly abrasive sand and gravel. Bulletin 151 describes many other interesting instances of Morris Dredge performance. Write for your copy.

Morris Dredge Communities . . . .

Where a number of sand and gravel producers are operating in adjacent deposits, it frequently happens that because of the wide preference for Morris Dredges, a Morris Dredge family group will be working close together, each dredge being separately owned by the various companies. One interesting Morris group of this kind is operating on the Kaw River in Kansas. Another instance is in Cleveland, Ohio, where six Morris Dredges, owned by different companies, are working within two miles of each other. The many reasons for this popularity of Morris Dredges are explained in a bulletin which every sand and gravel producer should have. Your copy awaits your request.

For authoritative recommendations on any pumping or dredging problem, write to Morris Machine Works, Baldwinsville, N. Y. Representatives in principal cities.

CLASSIFIED ADVERTISEMENTS

POSITIONS WANTED — POSITIONS VACANT—two cents a word. Set in six-point type. Minimum $1.00 each insertion, payable in advance.

INFORMATION
Box numbers in care of our office. An advertising inch is measured vertically in one column. Three columns, 30 inches to the page.

CLASSIFIED — Displayed or undisplayed. Rate per column inch, $4.00. Unless on contract basis, advertisements must be paid for in advance of insertion.

Used Equipment for Sale

CONSOLIDATED
GOOD USED EQUIPMENT

We have just purchased
4—6'x40' DIRECT HEAT ROTARY DRYERS, two heavy duty with ½" shells, feed and discharge end spring seals. Two with ¾" shells. USED TWO MONTHS. Still set up in plant near Dunkirk, N. Y. Must be moved within 30 days. Act at once!

5—Ruggles-Coles Rotary Dryers, class A, 5'x26', 6x35, 80"x45', 8'8"x85'. Also 1—3'x20' F-1.
2—4'x35', 5x30' Indirect Heat Rotary Dryers.
1—4'x30' American Process Rotary Dryer.

2—Raymond High Side Roller Mills, 3-roll, 5-roll; 1—5-roll Low Side.
4—Raymond Pulverizers No. 0000, 00, 1; No. 00 Screen Mill.
6—Hardinge Iron Lined Ball Mills, 3'x8', 4½'x16", 6'x22". Also other sizes.
1—No. 32 Marcy Ball Mill.
1—No. 2 Sturtevant Ring Roll Mill, chain drive.
4—3'x6' Sturtevant Moto-Vibro Screens, 2-deck.
3—Sturtevant Rotary Fine Crushers, No. 1½, No. 1.
2—36x16, 20x14" Sturtevant Crushing Rolls.

1—18"x36" McLanahan-Stone Single Roll Crusher, Texrope drive, 25 H.P. 3/60/440 volt motor.
1—7"x24" Sturtevant Jaw Crusher, to ½".
1—40"x42" Allis-Chalmers Jaw Crusher.
1—40"x42" Bacon-Farrel Jaw Crusher.
1—24"x20" Jeffrey type "B" Hammer Mill.
1—36x36" No. 4XC Gruendler Hammer Mill, ball bearings. Also all other sizes.
2—6'x12' Hardinge Iron Lined Rod Mills.
1—4'x8' Kennedy Iron Lined Ball-Tube Mill.
1—3'x12' Hendy Iron Lined Tube Mill.
2—Gayco Air Separators, 10', 30".
10—Tyler Hummer Screens, 3x5 triple deck, No. 31; 2—3'x5' No. 31, single deck; 3—4'x7' No. 60, double deck. Also all other makes of Vibrating Screens.

Just a partial list.
WE WILL BUY A SINGLE MACHINE OR COMPLETE PLANT.
What do you wish to sell? Send us details.

CONSOLIDATED PRODUCTS COMPANY, INC.
15-16-17 Park Row New York, N. Y.
Plant and Shops at Newark, N. J., cover 8 acres of ground.

---

3 ft. & 4 ft. Symons Cone Crushers.
60, 80, 180 & 360 HP Diesel Engines.
4—750 HP Busch Sulzer Diesel Units.
15-Ton 70-ft. Boom Stiff-Legged Derrick.
Bonnot 4x22 Tube Mill & Traylor 6x8.
750 Yd., 1250 Yd. & 2000 Yd. Asphalt Plants.
Champion 1030 & 1040 Roller Bear. Jaw Crushers.
Pennsylvania SX4, SX6 & SXT12 Hammermills.
150 Ton 50 ft. R.R. Track Scale.
Superior 10 In., 13" & 36 In. McCully Crushers.
Traylor 4—10 TZ Reduction Crusher.
8—3 Yd. Koppel V Shape, 36 Ga. Dump Cars.
Jaw Crushers: 60x84, 42x36, 42x40, 36x24 & 30x10.
3300 ft. I.R. Class PRE-2 Elec. Air Compressor.
2040 ft. I.R. Class PRE-2 Elec. Air Compressor.
1730 ft. Bury 1927 Model Elec. Air Compressor.
676 Ft. Worthington Duplex Elec. Air Compressor.
¾ Yd. P&H Gas Shovel.
¾ Yd. Erie B Steam Shovel.
36x36 Jeffrey B2 Pulverizer.
25 Ton Browning Locomotive Crane.
Kennedy 25 & 49 Gearless Crushers.
5 Ton Whitcomb 24 Ga. Gas Locomotive.
200 H.P., 3p., 60c., 440v. 690 RPM Motor.
No. 36 American Ring Hammermill.
Lawrence 10", 40 H.P. Elec. Centr. Pump.
400 Ton Steel Bin.
1 Yd. Sauerman Elec. Slackline Outfit.
No. 00 Raymond Beater Mill.
60 In. by 15 Ft. Revolving Screen.
40 Ton Browning Locomotive Crane.
34 and 50 I. R. Drill Sharpeners.
24 In. by 100 Ft. Belt Conveyor.
No. 3 Williams Helix Seal Impact Mill.
No. 0 Raymond Pulverizer and Cyclone Separator.
12 Ton Milwaukee Std. Ga. Gas Locomotive.
60 HP Drum Gas Hoist.
8 Hummer Vibrating Screens.

R. C. STANHOPE, INC.
875 Sixth Ave. New York, N. Y.

FOR SALE

FIVE
3½-yard

BLAW-KNOX AGITATORS

On Brockway Dual Pneumatic Tire Trucks, Model B T, with double high lift hoist. These machines are in first class condition and can be purchased for the sum of $1,000.00 each.

MALDEN CRUSHED STONE CO.
BROADWAY, SAUGUS, MASS.

NEW HOLLOW DRILL STEEL
BARGAIN PRICES
100,000 lbs. 1", 1⅛" and 1¼" HOLLOW DRILL Steel, Round, Hexagon and Quarter Octagon. Best known SWEDISH Brands. Write for prices.

Marine Metal & Supply Co.
167 South Street New York City

FOR SALE

2 Large Size Iron Fireman Soft Coal Stokers.

9 Industrial Size Oil Burners.

1 Double Drum 12 thousand pound pull on rope at 63 FPM Car Puller Link Belt complete with cables, motor and control.

Great Lakes
Portland Cement Company
Post Office Box 960,
BUFFALO, N. Y.

FINE EQUIPMENT—LOW PRICES
600 HP 500 KVA 2300 V. DeLaVergne Diesel.
120/140 HP Fairbanks Morse Diesel Engine.
2 & 3 Drum Lidgerwood Steam Hoists.
15" Ellis Sand & Gravel Dredge Pump.

MISSISSIPPI VALLEY EQUIPMENT CO.
515 Locust St. St. Louis, Mo.
Cars, Locomotives, Crushers, Compressors, Generators, Derricks, Rail, Tanks, Steel Piling

---

Gardner Denver Portable Compressor, 160'.
I.R. 2-Stage Belted Air Compressor, 446'.
Schramm Compressor, 15 HP Electric AC, 120'.
Hayward 1-yd. G Clamshell Material Bucket.
Owen ¾-yd. Clamshell Material Bucket.
Goulds 8" Centrif. Electric Pump, 1000 GPM.
Domestic 6" Self-Priming Cent. Pump, Buda.
Double Diaphragm 3" Electric Pump, 110 v.
150 Robins 30" Trough Idlers and Pulleys.
Trippers for 18" and 24" Belt Conveyors.
Haiss-Fordson Dig. Bucket Loader, wheels.
Dake 1-Drum Hoist, 15 hp. A.C. Electric.
Clyde 3-Drum 9x10 Steam Hoist.
Swivel Dump Cars, 24" Gauge, ¾-yard.
V-shaped Cars and Portable Track.
Whitcomb 36" Gauge Locomotives, 4&7 ton.
Hummer 2-Deck 3'x5' Vibrating Screens.
Buda 35 hp. 4-cyl. Gas Engine, with pulley.
Electric Welder, 225 amps., LeRoi Engine.
Buffalo Blower, No. 11, 40 HP, AC Motor.

G. A. Unverzagt, 15 Park Row, New York City

FOR SALE

3000 H. P.
DIESEL ELECTRIC PLANT

4—750 HP Busch-Sulzer Engines, direct connected to 500 KW G.E. Generator, 60 cy. 3 ph. 2300 V.

1—500 KW Westinghouse 60 cy. 550 V. Rotary Converter.

1—20-ton American 8-wheel Loco. Crane, 50-ft. boom.

HYMAN-MICHAELS COMPANY
20 No. Wacker Drive
Chicago

Railway Exchange, St. Louis — 101 West 31st St., New York

Jaw Crushers—2"x6" up to 66"x84".
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Direct Heat Rotary Dryers—4'x30', 5'x30', 5½'x40', 6'x50', and 3½'x25'.
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New dryers made for all purposes.
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(Classified Advertising Continued on Next Page)

Continued from Preceding Page

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30-ton American 4-wheel saddle tank locomotive, 12x18" cylinders.
33-ton Vulcan 4-wheel saddle tank locomotive, 13x18" cylinders, (Two Duplicates).
36-ton Porter 4-wheel saddle tank locomotives, 14x20" cylinders, (Two Duplicates).
40-ton Baldwin 4-wheel saddle tank locomotives, 14x22" cylinders, (Five duplicates).
40-ton Vulcan 4-wheel saddle tank locomotives, 14x22" cylinders, (Two Duplicates).
50-ton American 4-wheel saddle tank locomotives, 16x24" cylinders, (Three Duplicates).
55-ton Baldwin 4-wheel saddle tank locomotive, 18x24" cylinders.
60-ton Baldwin 6-wheel saddle tank locomotive, 18x24" cylinders.
70-ton American 6-wheel switching locomotive with separate tender, 20x26" cylinders, (Two Duplicates).
100-ton American 8-wheel switching locomotive with separate tender, 23x28" cylinders.

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2—450 Marion Diesel Electric Shovels.
2—20-ton 100' Boom Steel Stiffleg Derricks and 100 HP. 3-Drum Electric Hoists.
3—500 cu. ft. Chicago Pneumatic Air Compressors.
1—100 Hp. Locomotive Type Boiler.
60 H.P. Clyde 2 speeds Gas Hoist.
6—4 in., 6 in., 8 in. Centrifugal Pumps.
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24 in. by 400 ft. Belt Conveyor.
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6—12 and 14 ton 36 ga. Gas Locomotives.
30—Western 4 yds. and 5 yds. Dump Cars.
528 ft. Ingersoll Rand Air Compressors.

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Complete Hummer Start & Operate Equipment

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☐ 3—Hayward 1¼ Yard Snow Buckets.
☐ 1—Owen 2½ yd. Type "S Rehandling Bucket.
☐ 1—Haiss ¾ yd. HiPower Digging Bucket with teeth.
☐ 1—Haiss ¾ yd. Contractor rehandling bucket.
☐ 1—Hayward Class "E" 2-yd. Rehandling Bucket.
☐ 1—Blaw Knox ¾ yd. Dread Naught type Bucket with teeth.
☐ 1—Haiss 1 yd. Lever Arm Bucket, rented one month.

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☐ 1—Haiss 2-yd. a min. Creeper Truck Loader.
☐ 1—Haiss 25' 16" Trough Conveyor, Gas-Elec.
☐ 1—Snow Plow Model 10A Champion, 8' wide, new $80.

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3—No. 00, 0 Raymond Mills, roller bearing.
2—Sturtevant Newaygo Screens.
1—Jeffrey Conveyor System.
1—Allis-Chalmers No. 6K Gyratory Crusher.
3—Rotary Screens, 3'x10', 4'x16'.
1—Traylor Crushing Rolls, style A, 30"x14".
1—4½'x12' Abbe Tube Mill.
1—Nova 8 H.P. Gasoline Hoist.
Miscellaneous Bucket and Belt Conveyors, etc.

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12—5-yd. 36" ga. Western Dump Cars.
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4—1½-yd. 36" ga. Insley Steel V Dump Cars.
2—3½-ton 36" ga. Whitcomb Gasoline Locomotives.
1—9x10 Sturtevant Vertical Steam Engine.
1—10x10x12 Ingersoll Steam-Driven Air Compressor.
1—9x10 Lidgerwood 3-Drum Steam Hoist.
1—8¼x8 Lidgerwood S.D. Steam Hoist.
22—12-yd. Western std. ga. Air or Hand Dump Cars.
2—40-ton Baldwin S.T. Locomotives, 14x22 cyls.
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DUMP CARS, for standard and 36" gauge.
Equipment for pits and quarries.

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Large lot including std. ga. 6- and 12-yd. and 20-yd., 36-ga. 5-yd., and 24-ga. 1½-yd. Also std. ga. flat cars and ballast cars.

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1—Industrial Brownhoist Model DC Diesel crane. Serial 5176, 60-ft. boom, 1¼-yd. bucket.

2—Osgood No. 2054, 2069, with 40-ft. boom, 1 with 1-yd. shovel front.

1—Brownhoist No. 2, Ser. 9964, 40-ft. boom, 1-yd. bucket.

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1—Allis-Chalmers Gates No. 6.

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32—Gasoline locomotives from 14-ton to 2-ton standard 36 and 24-ga.

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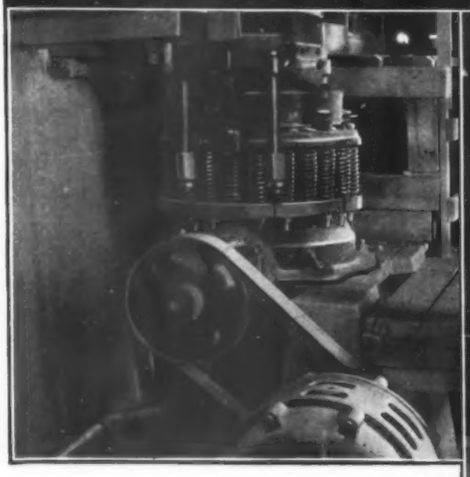

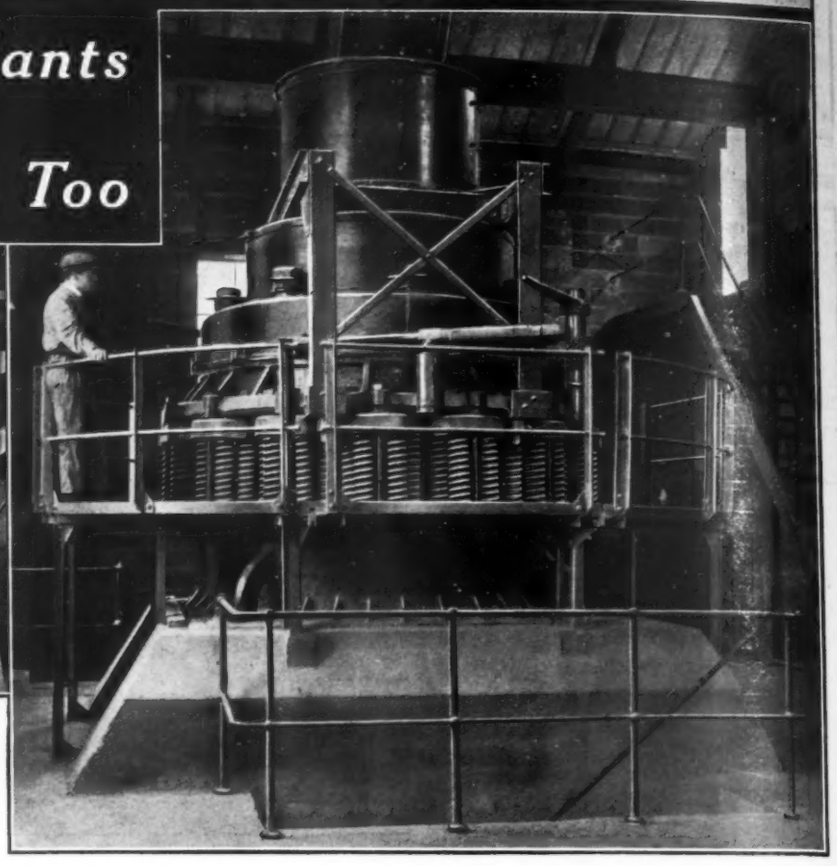

Both of these installations are in limestone plants. The 7-foot at the right is in one of the largest plants of its kind, while at the left, the 2-foot is used where only a limited amount of fine product is desired.

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